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THE MEDICAL WITNESS IN COURT.[1]

By HIS HONOUR JUDGE CONYBEARE,

Chairman, Workers' Compensation Commission of New South Wales.

WHEN I was first approached by Dr. Malcolm Finlayson and Dr. Gordon Smith to give this talk, some discussion took place between us about various subjects which would be likely to be of interest to this Section of Occupational Medicine, and it was eventually thought that something calculated to be of practical rather than of academic interest would be desirable.

Hence these observations tonight are addressed primarily to those medical people who are likely to find themselves called upon to give evidence in court. Nowadays this is an increasing liability, because we live in times in which our community is developing more and more complicated relationships amongst its members, which give rise to more and more litigation. For instance, the mere use by the individual of the public highway has witnessed an enormous increase in litigation arising out of it. Thus the medical man may be required to give evidence in common law cases relating to claims for damages for personal injuries: in Probate suits involving questions of mental and testamentary capacity; in affiliation and matrimonial causes concerning legitimacy of infants; in workers' compensation and other industrial cases relating to injuries and states of bodily health connected with conditions and circumstances of employment; and in criminal prosecutions and coronial inquiries as to the causes of wounds and death. He may even be involved in giving evidence in cases involving claims against colleagues for negligence in the performance of their professional work, in which there have been some notable instances in recent years. It is with his position and responsibilities as a witness in all such cases that we are concerned tonight.

For the purpose of this discussion we may start from the point that the doctor is almost always called as an "expert" witness to give "opinion" evidence, and in the law of evidence the terms "opinion" and "expert" have well defined connotations and have been the subject of much judicial comment. There are, of course, many kinds of "expert" witnesses and "opinion" evidence—for example, engineers, analysts, architects, handwriting experts, property valuators, and even lawyers themselves when some question of foreign law is in issue. But it must be remembered that the admission of the opinions of experts is an exception to the general rule of evidence which

[1] Read at a meeting of the Section of Occupational Medicine of the New South Wales Branch of the British Medical Association on July 8, 1953.

excludes the opinions, inferences or beliefs of individuals. Both the rule and its exception are grounded in sound reason. Generally the witness is called to give evidence as to facts relevant to the issues before the court. He can testify only as to that which he himself has directly observed by way of his own senses; he is not permitted to interpret the facts or express his inferences from them. That is the function of the tribunal trying the issues. Nor, as a general rule, is he entitled to offer hearsay evidence—that is, facts he has heard from somebody else: "Hearsay is not evidence." Again, the fact may not be proved by saying that a person is of opinion that the fact exists. Generally speaking, a witness's opinion is not admissible. If the question at issue is whether the accused was illegally upon certain premises on a given occasion, it is inadmissible in law for a witness to say that in his opinion the person he saw running away from the *locus in quo* was the accused.

As long ago as 1621 it was stated in the case of Adams *versus* Canon:

> It is not satisfactory for the witness to say that which he thinks or persuadeth himself; and that for three reasons: (1) because the judge is to give an absolute sentence and therefore ought to have more sure ground than thinking; (2) the witness cannot be prosecuted for perjury, and (3) that judges are always to give judgment *secundem allegata et probata* notwithstanding private individuals think otherwise.

But when the fact to be proved is one, the existence of which is incapable of being positively substantiated or denied, being a question of science or art, as to which only persons of special skill, technical training and experience can speak, such persons may then state their opinions.

However, although the law has admitted the opinions of experts in evidence, it appears to have done so grudgingly and to have looked askance at such evidence. For example, Sir George Jessel, a very distinguished Master of the Rolls in England, made the following comment in respect of some mining experts (Lord Abinger *versus* Ashton, 1873 Law Reports, Equity Cases, 17 : 373):

> I may say what I think I have often said before, that in matters of opinion I very much distrust expert evidence, for several reasons. In the first place, although the evidence is given upon oath, in point of fact the person knows he cannot be indicted for perjury, because it is only evidence as to a matter of opinion. So that you have not the authority of legal sanction. A dishonest man, knowing he could not be punished, might be inclined to indulge in extravagant assertions on an occasion that required it. But that is not all. Expert evidence of this kind is evidence of persons who sometimes live by their business, but in all cases are remunerated for their evidence. An expert is not like an ordinary witness, who hopes to get his expenses, but he is employed and paid in the sense of gain, being employed by the person who calls him.
>
> Now it is natural that his mind, however honest he may be, should be biassed in favour of the person employing him, and accordingly we do find such bias. I have known the same thing apply to other professional men, and have warned young counsel against that bias in advising on an ordinary case. Undoubtedly there is a natural bias to do something serviceable for those who employ you and adequately remunerate you. It is very natural, and it is so effectual, that we constantly see persons, instead of considering themselves witnesses, rather consider themselves as the paid agents of the person who employs them.

And Phipson on "The Law of Evidence" (Eighth Edition, 1942, at page 380) has this to say on the value of expert evidence:

> The testimony of experts is often considered to be of slight value since they are proverbially, though perhaps unwittingly, biassed in favour of the side which calls them as well as over-ready to regard harmless facts as confirmation of preconceived theories: moreover, support or opposition to given hypotheses can generally be multiplied at will. Indeed, where the jury accept the mere untested opinion of experts in preference to direct and positive testimony as to facts, a new trial may be granted, and in the case of Bowden *v.* Bowden the court accepted the evidence of a wife as to the paternity of a ten months child in spite of the unanimous opinion of several doctors.

The reason for this distaste for opinion evidence lies in the law's constant insistence upon proof of facts as the foundation of its judgement.

Any judgement in law is something of great moment, resulting in far-reaching effects involving sometimes the liberty of the subject, the social and political status of individuals, or large sums of money or money's worth. Hence inferences, opinions and conclusions from the facts are the business of the tribunal itself and not of its witnesses. Opinion at its best is only an indirect way of proving a fact difficult to authenticate and verify, and very often countered by contradictory opinions of equal authority expressed with equal assurance.

Coming closer to home, I want to read to you the short judgement of Sir George Rich, Acting Chief Justice of the High Court of Australia, which he delivered in what is known as Forst's case (Adelaide Stevedoring Co. Ltd. *versus* Forst, 64 C.L.R. 538, at page 562):

> This is an appeal from a decision of the Supreme Court of South Australia consisting of Angas Parsons and Napier JJ., who allowed an appeal from an award of a special magistrate sitting under the Workmen's Compensation Act, 1932-1935 (S.A.).
>
> The special magistrate's award refused compensation to the now respondent, the widow of a deceased workman who collapsed while at work and died. A post-mortem examination disclosed evidence of a coronary thrombosis which would cause occlusion and consequent cardiac insufficiency. Having heard an abundance of medical evidence from witnesses whose attainments and eminence neither were nor could be challenged, but whose opinions exhibited no greater degree of unanimity than is commonly met with in other departments of abstruse knowledge and of scientific research, the learned magistrate arrived at a negative conclusion. His finding was, in substance, that coronary thrombosis could not, in the present state of knowledge, be connected with exertion and accordingly that it was not established that the workman's employment materially contributed to the cause of his death.
>
> The learned judges of the Full Court considered the whole of the medical evidence, as, under the Act, they are entitled to do, and, having described the duty of the court to arrive at some conclusion on an issue of fact, however "difficult or invidious" it might be made by the state of scientific knowledge and opinion, their Honours proceeded, by a course of reasoning which combined common sense with the application of logic to physiological facts, to infer "on the preponderance of probabilities" that the thrombus was precipitated as the result, in part, of some unusual exertion undertaken by the workman before his collapse.
>
> In my opinion the conclusion of the Full Court is correct. I am greatly impressed by the sequence of events. The deceased, who had arrived at an age when arterio-sclerosis and atheroma afflict mankind, was a stevedore's labourer. On the day of his death he climbed up the jib of the crane and lay prone on the crane with his arms outstretched, trying to replace a wire which had come off the gin. He failed to do so, returned to the deck and for some time, with his arms in a position raised over his head, helped in holding up a wire rope. Immediately after performing this task he collapsed. What weighs so much with me is the fact that he was brought to a standstill, as an ordinary lay observer would think, by the exertion he had undergone: Cf. Partridge Jones and John Paton Ltd. *v.* James (1933) A.C. 501, at p. 505. I do not see why a court should not begin its investigation, i.e., before hearing any medical testimony, from the standpoint of the presumptive inference which this sequence of events would naturally inspire in the mind of any common-sense person uninstructed in pathology. When he finds that a workman of the not-so-young standing attempts in a posture calculated by reason of the pressure on the stomach to disturb or arrest the rhythm of the heart a very strenuous task not forming part of his ordinary work and then collapses almost immediately and dies from a heart condition, why should not a court say that here is strong ground for a preliminary presumption of fact in favour of the view that the work materially contributed to the cause of death? From this standpoint the investigation of physiological and pathological opinion shows no more than the current medical views find insufficient reason for connecting coronary thrombosis with effort. Be it so. That to my mind is not

> enough to overturn or rebut the presumption which flows from the observed sequence of events. If medical knowledge develops strong positive reasons for saying that the lay common-sense presumption is wrong, the courts, no doubt, would gladly give effect to this affirmative information. But, while science presents us with no more than a blank negation, we can only await its positive results and in the meantime act on our own intuitive inferences.

This and the earlier references which I have read to you will serve, I hope, to indicate what you, as medical experts furnishing opinion evidence in courts generally, are really up against in giving evidence in a court case. A court case—or *lis* to use a Latinism—is really an orderly well-regulated controversy, a contest between opposing interests, a clash of contrary viewpoints. The claim of the plaintiff, the defence of the defendant, and the reply of the plaintiff, are all distilled through the processes of oral evidence by way of examination-in-chief, cross-examination and reexamination of all the witnesses, followed up by the arguments of the opposing advocates. Although it is not a perfect method because of the ever-present human equation, it is nevertheless a well-proved and well-regulated method of approaching and reaching the truth of a given proposition. It is no exaggeration to say that it ranks among our most cherished social institutions. It is a form of research, the analogue of the laboratory or clinical process of determining a technical or pathological question. The conductors of the investigation are the judge, jury and counsel. The witnesses furnish the facts or data. It can thus be readily and immediately appreciated how vitally important is the contribution of or the part played by the witness.

Now, notwithstanding the criticisms mentioned earlier, it must be said that the medical expert witness with his expert knowledge, training and intellectual integrity and his high professional ethic, is a valuable and often a necessary and sometimes the most important witness upon whom the court can rely, and one who cannot be done without for the determination of a question in issue. May I say that this consideration is especially applicable in my own jurisdiction in workers' compensation, in which almost invariably the medical witness is the most significant contributor to the debate.

My learned and esteemed predecessor, His Honour Judge Perdriau, once publicly observed that:

> By furnishing the tribunal with the best information according to the state of medical knowledge concerning questions in dispute, the members of your profession assist the tribunal in arriving at reasonable and impartial decisions and thus do justice between the parties. So long as eminent consultants continue to regard it as a public duty to assist tribunals in this manner, the community can have no just cause for complaint in regard to your profession's attitude towards and interest in its compensation and industrial problems.

That is a judicial dictum with which I warmly concur.

Let us now look at what is expected of the doctor in court. Firstly, as some palliative to the inhospitable attitude of the law illustrated above, the medical witness usually is privileged to wait in court until he is called upon and to hear all the evidence that goes before his own rather than to wait outside the hearing of the court as is required of all lay witnesses. This is a freely conceded gesture of respect to men of honour and intellectual integrity, and in my own experience, both at the Bar and on the Bench, has never been prejudiced or abused. (I have been told, however, of a story that in some case many years ago before the Workers' Compensation Commission, counsel asked the court to treat all medical witnesses in the same way as lay witnesses and to keep them outside until called. The result was that there were as many different clinical signs on examination as there were witnesses and an equal lack of unanimity of diagnoses.) For my part, I think the story is apocryphal.

Having been sworn—or having made his affirmation—the witness undergoes, firstly, examination-in-chief, which is conducted on behalf of the party who has called him. The competency of the expert is always a preliminary question for the judge, and, unless the witness is well known to the court, is established by questioning him as to his qualifications, experience, degrees *et cetera*. Although the expert must be skilled either by special study or by experience, the fact that he has not acquired his knowledge professionally goes merely to the weight rather than to the admissibility of his opinion. The object of examination-in-chief is to elicit facts upon which the witness's opinion is founded, followed by the opinion itself. Sometimes the doctor can speak directly as to the facts in issue. Sometimes he can speak only as to a history furnished to him wholly or partly by the patient and partly by members of his family or by his advisers. If the witness has obtained the history piecemeal, he should be careful always to specify the sources from which it is derived. Vexed questions in relation to histories frequently arise. The history is never admitted as evidence itself of the facts to which it relates; it is admitted only as the foundation of the opinion of the witness. If the history differs from that furnished directly on oath, the value of the opinion is so much the less. The importance of obtaining a complete and accurate history cannot be over-emphasized. It is the premise upon which the whole of the evidence of the expert witness rests. If I have any criticism to offer from my own experience, I think I can say that histories appear to me sometimes to have been taken perfunctorily and sketchily, and that they are occasionally deficient in particularity. The medical witness may refer to medical treatises and authorities in the course of his evidence to refresh his memory or to confirm or correct his opinion. He may also, with the leave of the judge, refresh his memory from any notes he has made in relation to the patient, provided that they were made at the time when he received the history and complaints upon which he has rested his diagnosis. He may also refer to reports he has made to employers, insurance companies or other authorities in relation to the patient; but great care should be taken to see that such reports correspond with and correlate with the original notes, if any. The doctor's notes of history, examination and opinion should be concise, complete and accurate, otherwise the opinion which is based upon them will be vulnerable to criticism.

Coming to the witness's expression of opinion, I want to read to you an extract from the judgement of Mr. Justice Denning, as he then was (Miller *versus* Minister of Pensions, 1947, 63 T.L.R. 474):

> It is useless for a medical man to give an opinion that a disease is or is not attributable to or aggravated by war service without giving his reasons. Such an opinion should be disregarded by a tribunal because it involved not only his scientific knowledge, but also his views on causation, the meaning of "attributable", "war service" and so forth, all of which are matters for the tribunal and not for him. Such an opinion is merely his view as to the way the tribunal ought to decide, and is merely an opinion which, if rightly formed, could only be drawn from the same premises as those from which the tribunal are to determine the matter. In order to be of value a medical opinion should not be in general terms such as to usurp the function of the tribunal, but should point out the probable or possible causes of the disease and of any aggravation of it, giving the degree of probability, and then leaving it to the tribunal to decide whether or not on the facts of the particular case the claim should be allowed. In cases where the ætiology, that is, the scientific origin, of the disease is known there is or should be little difficulty in stating the causes of the disease and of any aggravation of it, but the cases where the ætiology is unknown or imperfectly known present great difficulty.

This observation applies particularly to that difficult class of case relating to disease which is alleged to be related to employment conditions. The important thing to observe is the learned Judge's statement that the witness's opinion should avoid generalities as to the relationship of the disease to the work, and should indicate only possible or probable causes of the disease and of any aggravation—indicating the degree of probability, and leaving it to the tribunal to decide whether the particular facts warrant the inferences being drawn.

Of course I admit that counsel in examination-in-chief often ask questions in leading form and thus induce the expert too readily to acquiesce.

The next phase of the doctor's function in court is in his cross-examination by the party opposing the party who has called him. It consists of an interrogation of the witness by counsel for that party, whose object is to secure from the witness admissions, concessions or qualifications which cut down or modify the evidence which has already been given in chief and positively to assist and implement the case of the cross-examiner. The witness is liable to be questioned as to his qualifications, although this is unusual, and as to his credit in so far as it is affected by his observations and reasoning disclosed in his evidence in chief. It must be constantly borne in mind that counsel, especially when he is cross-examining, is overtly biassed—he is paid to be. It is his job to promote his own case, to do everything within his power to convert the witness from his earlier position to his own view of the facts and to persuade him to adopt his client's case. Questions by cross-examining counsel are—or should be—mostly leading questions, and competent, properly briefed counsel do not as a rule ask questions to which they do not know the answer. The witness, if he is prudent, will presume that counsel cross-examining him is competent and well-briefed until it appears otherwise. I would be inclined to say that counsel is occasionally not well briefed. Cross-examination is essentially a contest of minds, oft-times an unequal contest in favour of the witness. If the expert witness has been meticulous in the receipt of the history and the patient's complaints, careful in his physical examination of the patient, industrious in the making of his notes and circumspect in the preparation of his opinion, if he has fortified himself by an objective mental approach to the problem in the first place, he invariably has the advantage over the cross-examiner, who, no matter how well instructed and advised, is not on his own ground and cannot be expected to have the same intimate knowledge as the expert.

If the cross-examiner appears to have been partially successful in making some inroads upon the evidence given in chief, the witness will be reexamined by the counsel who called him in the first place, when he is permitted to give explanations arising out of his cross-examination. It is essentially in the nature of a rehabilitation process of the witness's evidence in chief.

Throughout his evidence, whether in examination-in-chief, cross-examination or reexamination, it must be remembered that the expert witness has a single transcendent obligation, and that is to assist the tribunal to arrive at a just and true solution of the questions in hand. Medical witnesses, whoever they may be, by virtue of their special learning and experience, appear in court only for that purpose. It has been said that the expert "is in a relatively independent position and can therefore easily divest his mind of bias and approach the case in a judicial spirit. This is his duty to his position and to the medical profession". This, in my opinion, is a true statement of his obligation and I would like especially to emphasize that his immunity from legal penalties—prosecution for perjury, for instance—itself imposes an equally exacting professional responsibility. The correct psychological approach of the expert is marked by a scientific detachment which may be described as a disinterested interest. It need not amount to an austere neutrality. The expert witness, while eschewing any emotional colouring to his opinion, is not precluded from exposing prevarication, mendacity or malingering, or any other imposition upon the court by the patient. If the fulfilment of the duty is done ardently as well as in good faith, so much the better.

I am reminded of something that occurred not many years ago that was brought to my mind by a colleague at the Bar. He had been retained in a Workers' Compensation case, and for the sake of expedition was requested by his instructing solicitor to get in touch directly with Dr. X, of Macquarie Street, who was to give evidence on behalf of the client. Upon my colleague's ringing the doctor—a busy practitioner accustomed to giving evidence before the Commission—and introducing the subject, the latter's first query was: "Which side am I on?" This, I may tell you, is authentic and serves to illustrate by contrast an undesirable state of mind.

In one sense, of course, it could be said that he was to give evidence for one side. His duty, however, was not to the side, but to give evidence to the court.

Let it be observed that there is no room or place in a court case for a "medical advocate"—indeed, the very expression is meaningless. I am aware that among those present tonight there are some doctors who are permanently engaged to companies and public authorities employing large numbers of people. To some of them I have been indebted when at the Bar for much valuable specialized information, instruction and advice. I am not unacquainted with their duties to their employers. But whatever their duties may be, when they attend to give evidence their duty is identical with that of the independent practitioner there.

In my experience at the Bar and on the Bench, I know of no single instance in which a doctor of that class appeared to have deviated from his paramount obligation to assist the tribunal in good faith and to the best of his ability, nor am I aware of any conflict of duty having occasioned embarrassment or prejudice.

In conclusion, I must acknowledge that many of the foregoing observations are trite and self-evident; but I venture to think that an occasional resort to and restatement of elementary things are a wholesome and refreshing mental tonic.

SIMULTANEOUS IMMUNIZATION OF INFANTS AGAINST WHOOPING-COUGH, DIPHTHERIA AND TETANUS.

By E. A. NORTH, N. J. LEHMANN and R. W. PATTERSON.
From the Commonwealth Serum Laboratories, Melbourne.

IN spite of a recent trend to the use of combined immunizing agents overseas (Parish, 1952; Bousfield, 1952*a* and 1952*b*; North and Patterson, 1953*b*), the principle of simultaneous immunization of infants against whooping-cough and diphtheria is by no means unanimously accepted (Holt, 1952; Keogh, 1952). On the other hand, it seems to be generally agreed that simultaneous immunization against diphtheria and tetanus is sound both in principle and in practice (North and Patterson, 1953*b*).

In this paper objections that have been raised to the use of combined prophylactics containing pertussis vaccine and diphtheria toxoid will be discussed, and an attempt will be made to show, both from a review of the literature and from our own experience, that they can be largely met.

The first and strongest objection to simultaneous immunization against whooping-cough and diphtheria is that protection against these two infections is needed at different periods of the child's life. More than half the deaths from whooping-cough occur during the first year, and the peak mortality has been reached by the time the infant is six months old (Holt, 1952). By contrast both the morbidity and the mortality from diphtheria are low in babies aged under twelve months (McLorinan, 1953; Pearlman, 1952).

Whilst it is generally agreed that injections against whooping-cough should be commenced early (Parish, 1952; Bousfield, 1952*b*; McGuiness, 1952), opinions differ regarding the optimum age for starting diphtheria immunization (North and Patterson, 1953*b*). Some authorities favour waiting until the baby is about nine months old, contending that the stimulus should be applied at the time when the child is beginning really to need protection and when it will more certainly respond to the antigen. The latter argument is based on the finding that some young

infants possess passively transferred maternal antibody, which interferes with the response to the antigen sometimes even beyond the sixth month (Vahlquist, 1949; Cooke, 1948; Barr *et alii*, 1949).

The opposing view, as expressed by McGuiness (1952), is that this is of theoretical rather than of practical importance. Babies are immune whilst carrying the maternal antibody, and their antitoxin levels will rise sharply after a "booster" dose of antigen some months later. There is much evidence (Bousfield, 1949; di Sant'Agnesse, 1950; Sauer and Tucker, 1950; Christie and Peterson, 1951) that young babies can be successfully immunized against diphtheria.

It may be said that there is now strong support for the principle of early immunization against both pertussis (Parish, 1952; Bousfield, 1952*a*; McGuiness, 1952) and diphtheria (McGuiness, 1952; Parish, 1952). If, however, the principle of early immunization against both infections is accepted, the objections to the use of combined whooping-cough and diphtheria prophylactics are still not wholly met.

Informed opinion as to the value of immunization against diphtheria is unanimous, and it is known that the injections rarely cause severe reactions in babies. On the other hand, some doubt the value of whooping-cough vaccines, injection of which is often followed by unpleasant and occasionally by dangerous side effects (Byers and Moll, 1948; Toomey, 1949; Globus and Kohn, 1949).

It is argued, therefore, by some opponents of combined immunization, that the use of a combined prophylactic will simply result in fewer babies being immunized against diphtheria because of severe reactions to the pertussis component. Why, it is asked, should diphtheria immunization projects be prejudiced by adding to the diphtheria antigen pertussis vaccine which is not of proven value?

H. and E. J. Macdonald (1933) showed conclusively twenty years ago that whooping-cough can be prevented by injecting a vaccine prepared from a freshly isolated Phase I strain of *Hæmophilus pertussis* (Leslie and Gardner, 1931; Sauer, 1933). Since the Macdonalds' study many successful large-scale trials with whooping-cough vaccines have been carried out. However, poor results have been reported both in the United States (Doull *et alii*, 1936; Siegel and Goldberger, 1937) and in England (McFarlane *et alii*, 1945).

In view of the favourable results of most of the American studies, the British Medical Research Council's workers concluded that the vaccines used in the trials of 1942-1944 (McFarlane *et alii*, 1945) differed in some material though unknown way from vaccines which had been shown to give protection. It was therefore decided to carry out a fresh series of trials and to include in them vaccines which in previous studies had been reported to be effective (Medical Research Council, 1951).

This outstanding study showed that each of the several vaccines, in the dosage schedule used, gave significant protection against whooping-cough and lessened the severity of symptoms in those cases that did occur. During the two to three year periods of observation there was no evidence of waning protection, although some of the vaccines tested proved better prophylactics than others. Whilst the study has clearly proved that certain vaccines will give significant protection, the problem of the production of a reliable vaccine has not been solved.

The tendency to reactions following the injection of pertussis vaccines is naturally influenced by the number of bacterial cells they contain. Some years ago, Dow (1940) called attention to the pronounced difference in actual bacterial content in vaccines from different reputable North American laboratories, compared with their labelled strength. More recently it was found that an English vaccine was about four times as turbid as an American vaccine having the same labelled strength (McFarlane *et alii*, 1945). It was found that children receiving a dose of an English vaccine containing 15,000 million *H. pertussis* organisms had severe reactions. This dose would correspond to 60,000 million organisms on the American scale.

In the United States an opacity standard for vaccines is now provided, and in the recent Medical Research Council trials (1951) concentrations of all vaccines were given in terms of this American standard, which in the near future is likely to become an international standard.

The Medical Research Council (1951) has shown that significant protection can be obtained with a total dosage of as few as 60,000 million of *H. pertussis* organisms as estimated on this scale, divided between three injections given at monthly intervals. Further to quote the Medical Research Council report (1951):

> With the plain vaccine no severe local or general reactions were observed, although a number of children developed a rise in temperature within 24 hours of inoculation and in some the site of inoculation was red and swollen for one to two days. In only a few instances were the reactions such that the mother refused to co-operate further.

As an indication that some authorities on preventive medicine do not fear severe reactions to injections of pertussis vaccine, Bousfield (1952*a*) suggests that the offering of prophylaxis against whooping-cough "constitutes a tempting bait for the acceptance of diphtheria immunization".

As significant protection after immunization may last for at least three to four years (Kendrick *et alii*, 1946; Medical Research Council, 1951), one course of injections should carry a child over the main danger period. This is important, because reactions tend to be more severe in older children and especially in those who have previously been immunized (McComb and Trafton, 1950). It is particularly dangerous to give pertussis vaccine to children suffering from whooping-cough (Cockburn, 1951). Bousfield (1952*b*) places the upper limit for whooping-cough prophylaxis at five years and does not favour repeated immunization.

Whilst the addition of diphtheria toxoid does not apparently adversely affect pertussis vaccine (Kendrick, 1942; Bell, 1948*b*), the antigenicity of diphtheria and tetanus toxoids is probably enhanced by the vaccine (Bell, 1948*a*; Faragó and Pusztai, 1949; Ungar, 1952; Fraser *et alii*, 1943; Maclean and Holt, 1940). Barr and Llewellyn-Jones (1953) conclude from animal experiments that the effect may depend on the relative proportion of the antigens. Our own experience (Table I) supports other evidence that the presence of the vaccine enhances the antigenicity of toxoid.

The main objection to combining whooping-cough and diphtheria immunization—the difference in age at which protection is required—does not apply to tetanus prophylaxis. The response to the tetanus component in diphtheria-tetanus-pertussis antigens is uniformly good (Miller and Ryan, 1948; Sauer and Tucker, 1950; Tyson *et alii*, 1950; Murray, 1950; di Sant'Agnesse, 1950; Peterson and Christie, 1951; Volk, 1949), as is the case when it is given alone (North and Patterson, 1953*a*) or combined with diphtheria toxoid (North and Patterson, 1953*b*). The essentials are that immunization be undertaken before the child starts to walk and that protection be maintained by "booster" doses at suitable intervals (North and Patterson, 1953*a* and 1953*b*); otherwise arguments for and against combining diphtheria toxoid with pertussis vaccine apply equally to tetanus toxoid.

A minimum of eight and preferably nine injections are required to immunize a child against whooping-cough, diphtheria and tetanus separately. At least six are necessary if pertussis vaccine is given alone and the child is then immunized simultaneously against diphtheria and tetanus. Parents, children and doctors heartily dislike this multiplicity of injections. Therefore combined antigens—diphtheria, tetanus and pertussis—have much to recommend them for young children if adequate protection can be obtained without the production of reactions severe enough to make the parents unwilling to cooperate. The preparation and use of multiple antigens designed to meet these conditions will now be dealt with.

Of course I admit that counsel in examination-in-chief often ask questions in leading form and thus induce the expert too readily to acquiesce.

The next phase of the doctor's function in court is in his cross-examination by the party opposing the party who has called him. It consists of an interrogation of the witness by counsel for that party, whose object is to secure from the witness admissions, concessions or qualifications which cut down or modify the evidence which has already been given in chief and positively to assist and implement the case of the cross-examiner. The witness is liable to be questioned as to his qualifications, although this is unusual, and as to his credit in so far as it is affected by his observations and reasoning disclosed in his evidence in chief. It must be constantly borne in mind that counsel, especially when he is cross-examining, is overtly biassed—he is paid to be. It is his job to promote his own case, to do everything within his power to convert the witness from his earlier position to his own view of the facts and to persuade him to adopt his client's case. Questions by cross-examining counsel are—or should be—mostly leading questions, and competent, properly briefed counsel do not as a rule ask questions to which they do not know the answer. The witness, if he is prudent, will presume that counsel cross-examining him is competent and well-briefed until it appears otherwise. I would be inclined to say that counsel is occasionally not well briefed. Cross-examination is essentially a contest of minds, oft-times an unequal contest in favour of the witness. If the expert witness has been meticulous in the receipt of the history and the patient's complaints, careful in his physical examination of the patient, industrious in the making of his notes and circumspect in the preparation of his opinion, if he has fortified himself by an objective mental approach to the problem in the first place, he invariably has the advantage over the cross-examiner, who, no matter how well instructed and advised, is not on his own ground and cannot be expected to have the same intimate knowledge as the expert.

If the cross-examiner appears to have been partially successful in making some inroads upon the evidence given in chief, the witness will be reexamined by the counsel who called him in the first place, when he is permitted to give explanations arising out of his cross-examination. It is essentially in the nature of a rehabilitation process of the witness's evidence in chief.

Throughout his evidence, whether in examination-in-chief, cross-examination or reexamination, it must be remembered that the expert witness has a single transcendent obligation, and that is to assist the tribunal to arrive at a just and true solution of the questions in hand. Medical witnesses, whoever they may be, by virtue of their special learning and experience, appear in court only for that purpose. It has been said that the expert "is in a relatively independent position and can therefore easily divest his mind of bias and approach the case in a judicial spirit. This is his duty to his position and to the medical profession". This, in my opinion, is a true statement of his obligation and I would like especially to emphasize that his immunity from legal penalties—prosecution for perjury, for instance—itself imposes an equally exacting professional responsibility. The correct psychological approach of the expert is marked by a scientific detachment which may be described as a disinterested interest. It need not amount to an austere neutrality. The expert witness, while eschewing any emotional colouring to his opinion, is not precluded from exposing prevarication, mendacity or malingering, or any other imposition upon the court by the patient. If the fulfilment of the duty is done ardently as well as in good faith, so much the better.

I am reminded of something that occurred not many years ago that was brought to my mind by a colleague at the Bar. He had been retained in a Workers' Compensation case, and for the sake of expedition was requested by his instructing solicitor to get in touch directly with Dr. X, of Macquarie Street, who was to give evidence on behalf of the client. Upon my colleague's ringing the doctor—a busy practitioner accustomed to giving evidence before the Commission—and introducing the subject, the latter's first query was: "Which side am I on?" This, I may tell you, is authentic and serves to illustrate by contrast an undesirable state of mind.

In one sense, of course, it could be said that he was to give evidence for one side. His duty, however, was not to the side, but to give evidence to the court.

Let it be observed that there is no room or place in a court case for a "medical advocate"—indeed, the very expression is meaningless. I am aware that among those present tonight there are some doctors who are permanently engaged to companies and public authorities employing large numbers of people. To some of them I have been indebted when at the Bar for much valuable specialized information, instruction and advice. I am not unacquainted with their duties to their employers. But whatever their duties may be, when they attend to give evidence their duty is identical with that of the independent practitioner there.

In my experience at the Bar and on the Bench, I know of no single instance in which a doctor of that class appeared to have deviated from his paramount obligation to assist the tribunal in good faith and to the best of his ability, nor am I aware of any conflict of duty having occasioned embarrassment or prejudice.

In conclusion, I must acknowledge that many of the foregoing observations are trite and self-evident; but I venture to think that an occasional resort to and restatement of elementary things are a wholesome and refreshing mental tonic.

SIMULTANEOUS IMMUNIZATION OF INFANTS AGAINST WHOOPING-COUGH, DIPHTHERIA AND TETANUS.

By E. A. NORTH, N. J. LEHMANN and R. W. PATTERSON.

From the Commonwealth Serum Laboratories, Melbourne.

IN spite of a recent trend to the use of combined immunizing agents overseas (Parish, 1952; Bousfield, 1952*a* and 1952*b*; North and Patterson, 1953*b*), the principle of simultaneous immunization of infants against whooping-cough and diphtheria is by no means unanimously accepted (Holt, 1952; Keogh, 1952). On the other hand, it seems to be generally agreed that simultaneous immunization against diphtheria and tetanus is sound both in principle and in practice (North and Patterson, 1953*b*).

In this paper objections that have been raised to the use of combined prophylactics containing pertussis vaccine and diphtheria toxoid will be discussed, and an attempt will be made to show, both from a review of the literature and from our own experience, that they can be largely met.

The first and strongest objection to simultaneous immunization against whooping-cough and diphtheria is that protection against these two infections is needed at different periods of the child's life. More than half the deaths from whooping-cough occur during the first year, and the peak mortality has been reached by the time the infant is six months old (Holt, 1952). By contrast both the morbidity and the mortality from diphtheria are low in babies aged under twelve months (McLorinan, 1953; Pearlman, 1952).

Whilst it is generally agreed that injections against whooping-cough should be commenced early (Parish, 1952; Bousfield, 1952*b*; McGuiness, 1952), opinions differ regarding the optimum age for starting diphtheria immunization (North and Patterson, 1953*b*). Some authorities favour waiting until the baby is about nine months old, contending that the stimulus should be applied at the time when the child is beginning really to need protection and when it will more certainly respond to the antigen. The latter argument is based on the finding that some young

infants possess passively transferred maternal antibody, which interferes with the response to the antigen sometimes even beyond the sixth month (Vahlquist, 1949; Cooke, 1948; Barr *et alii*, 1949).

The opposing view, as expressed by McGuiness (1952), is that this is of theoretical rather than of practical importance. Babies are immune whilst carrying the maternal antibody, and their antitoxin levels will rise sharply after a "booster" dose of antigen some months later. There is much evidence (Bousfield, 1949; di Sant'Agnesse, 1950; Sauer and Tucker, 1950; Christie and Peterson, 1951) that young babies can be successfully immunized against diphtheria.

It may be said that there is now strong support for the principle of early immunization against both pertussis (Parish, 1952; Bousfield, 1952*a*; McGuiness, 1952) and diphtheria (McGuiness, 1952; Parish, 1952). If, however, the principle of early immunization against both infections is accepted, the objections to the use of combined whooping-cough and diphtheria prophylactics are still not wholly met.

Informed opinion as to the value of immunization against diphtheria is unanimous, and it is known that the injections rarely cause severe reactions in babies. On the other hand, some doubt the value of whooping-cough vaccines, injection of which is often followed by unpleasant and occasionally by dangerous side effects (Byers and Moll, 1948; Toomey, 1949; Globus and Kohn, 1949).

It is argued, therefore, by some opponents of combined immunization, that the use of a combined prophylactic will simply result in fewer babies being immunized against diphtheria because of severe reactions to the pertussis component. Why, it is asked, should diphtheria immunization projects be prejudiced by adding to the diphtheria antigen pertussis vaccine which is not of proven value?

H. and E. J. Macdonald (1933) showed conclusively twenty years ago that whooping-cough can be prevented by injecting a vaccine prepared from a freshly isolated Phase I strain of *Hæmophilus pertussis* (Leslie and Gardner, 1931; Sauer, 1933). Since the Macdonalds' study many successful large-scale trials with whooping-cough vaccines have been carried out. However, poor results have been reported both in the United States (Doull *et alii*, 1936; Siegel and Goldberger, 1937) and in England (McFarlane *et alii*, 1945).

In view of the favourable results of most of the American studies, the British Medical Research Council's workers concluded that the vaccines used in the trials of 1942-1944 (McFarlane *et alii*, 1945) differed in some material though unknown way from vaccines which had been shown to give protection. It was therefore decided to carry out a fresh series of trials and to include in them vaccines which in previous studies had been reported to be effective (Medical Research Council, 1951).

This outstanding study showed that each of the several vaccines, in the dosage schedule used, gave significant protection against whooping-cough and lessened the severity of symptoms in those cases that did occur. During the two to three year periods of observation there was no evidence of waning protection, although some of the vaccines tested proved better prophylactics than others. Whilst the study has clearly proved that certain vaccines will give significant protection, the problem of the production of a reliable vaccine has not been solved.

The tendency to reactions following the injection of pertussis vaccines is naturally influenced by the number of bacterial cells they contain. Some years ago, Dow (1940) called attention to the pronounced difference in actual bacterial content in vaccines from different reputable North American laboratories, compared with their labelled strength. More recently it was found that an English vaccine was about four times as turbid as an American vaccine having the same labelled strength (McFarlane *et alii*, 1945). It was found that children receiving a dose of an English vaccine containing 15,000 million *H. pertussis* organisms had severe reactions. This dose would correspond to 60,000 million organisms on the American scale.

In the United States an opacity standard for vaccines is now provided, and in the recent Medical Research Council trials (1951) concentrations of all vaccines were given in terms of this American standard, which in the near future is likely to become an international standard.

The Medical Research Council (1951) has shown that significant protection can be obtained with a total dosage of as few as 60,000 million of *H. pertussis* organisms as estimated on this scale, divided between three injections given at monthly intervals. Further to quote the Medical Research Council report (1951):

> With the plain vaccine no severe local or general reactions were observed, although a number of children developed a rise in temperature within 24 hours of inoculation and in some the site of inoculation was red and swollen for one to two days. In only a few instances were the reactions such that the mother refused to co-operate further.

As an indication that some authorities on preventive medicine do not fear severe reactions to injections of pertussis vaccine, Bousfield (1952*a*) suggests that the offering of prophylaxis against whooping-cough "constitutes a tempting bait for the acceptance of diphtheria immunization".

As significant protection after immunization may last for at least three to four years (Kendrick *et alii*, 1946; Medical Research Council, 1951), one course of injections should carry a child over the main danger period. This is important, because reactions tend to be more severe in older children and especially in those who have previously been immunized (McComb and Trafton, 1950). It is particularly dangerous to give pertussis vaccine to children suffering from whooping-cough (Cockburn, 1951). Bousfield (1952*b*) places the upper limit for whooping-cough prophylaxis at five years and does not favour repeated immunization.

Whilst the addition of diphtheria toxoid does not apparently adversely affect pertussis vaccine (Kendrick, 1942; Bell, 1948*b*), the antigenicity of diphtheria and tetanus toxoids is probably enhanced by the vaccine (Bell, 1948*a*; Faragó and Pusztai, 1949; Ungar, 1952; Fraser *et alii*, 1943; Maclean and Holt, 1940). Barr and Llewellyn-Jones (1953) conclude from animal experiments that the effect may depend on the relative proportion of the antigens. Our own experience (Table I) supports other evidence that the presence of the vaccine enhances the antigenicity of toxoid.

The main objection to combining whooping-cough and diphtheria immunization—the difference in age at which protection is required—does not apply to tetanus prophylaxis. The response to the tetanus component in diphtheria-tetanus-pertussis antigens is uniformly good (Miller and Ryan, 1948; Sauer and Tucker, 1950; Tyson *et alii*, 1950; Murray, 1950; di Sant'Agnesse, 1950; Peterson and Christie, 1951; Volk, 1949), as is the case when it is given alone (North and Patterson, 1953*a*) or combined with diphtheria toxoid (North and Patterson, 1953*b*). The essentials are that immunization be undertaken before the child starts to walk and that protection be maintained by "booster" doses at suitable intervals (North and Patterson, 1953*a* and 1953*b*); otherwise arguments for and against combining diphtheria toxoid with pertussis vaccine apply equally to tetanus toxoid.

A minimum of eight and preferably nine injections are required to immunize a child against whooping-cough, diphtheria and tetanus separately. At least six are necessary if pertussis vaccine is given alone and the child is then immunized simultaneously against diphtheria and tetanus. Parents, children and doctors heartily dislike this multiplicity of injections. Therefore combined antigens—diphtheria, tetanus and pertussis—have much to recommend them for young children if adequate protection can be obtained without the production of reactions severe enough to make the parents unwilling to cooperate. The preparation and use of multiple antigens designed to meet these conditions will now be dealt with.

Considerations Concerning Preparation of Multiple Antigens Containing Pertussis Vaccine.

As has already been indicated, the problems involved in making satisfactory combined antigens concern particularly the pertussis component. This, of course, should be potent and at the same time produce only relatively mild reactions, although some side effects must necessarily occur in a proportion of children (Medical Research Council, 1951).

Considerations of importance are the following: (*a*) the medium to be used for the growth of *H. pertussis*; (*b*) whether a mineral carrier should be added to the vaccine.

Most whooping-cough vaccines are still prepared from cultures grown on Bordet-Gengou medium, which consists of a potato-agar base to which blood is added. The colonies are scraped off the surface of this solid medium and, after being washed and centrifuged, the organisms are finally suspended in normal saline containing an antiseptic or bacteriostatic. Excessive washing impairs antigenicity (Miller, 1937), and whilst many vaccines of high potency have been prepared from Bordet-Gengou cultures (Medical Research Council, 1951), others have proved poor immunizing agents (Doull *et alii*, 1936; McFarlane *et alii*, 1945). The washing of Bordet-Gengou medium vaccines is necessary to rid them of as much blood and other foreign protein as is possible, because they tend to cause undesirable reactions.

TABLE I.
Antigenicity Tests of Tetanus Toxoid (Method of Greenberg et alii, 1943).

Antigen.	Dose. (L.f.)[1]	Number of Mice.	Dose of Toxin Three Weeks After Dosing with Antigen. (L.D.)[2]	Percentage Survivors after Seven Days' Observation.
Sub-standard purified toxoid.	20	10	20	80
	10	10	20	60
	5	10	20	20
	2·5	10	20	30
Purified toxoid in fluid (Cohen and Wheeler) vaccine.	10	10	20	100
	5	10	20	100
	2·5	10	20	80
Purified toxoid in fluid medium (no *H. pertussis*).	10	10	20	80
	5	10	20	50
	2·5	10	20	30

[1] L.f., limit of flocculation.
[2] L.D., average lethal dose.

The development of a liquid semi-synthetic medium capable of supporting the growth of Phase I *H. pertussis* (Hornibrook, 1939) has led to the production of vaccines consisting of unwashed killed *H. pertussis* suspended in the casein hydrolysate medium in which the bacteria are grown (Wilson, 1945; Farrell and Taylor, 1945; Cohen and Wheeler, 1946). Although their exact nature is uncertain (Keogh *et alii*, 1947; Robbins and Pillemer, 1950; Masry, 1952), casein hydrolysate culture supernates contain antigens that protect both animals and children against infection (Keogh *et alii*, 1947; Fisher, 1950; Fisher, 1952).

Whooping-cough vaccines prepared from liquid cultures may therefore be expected to be good antigens (Parish, 1952), and early reports indicate that they are (Wilson, 1953; Foley, 1946; Little, 1946; McComb and Trafton, 1950; McMaster, 1953). As they also appear to be well tolerated by babies, a vaccine of this nature was chosen as the pertussis component of our mixed antigens.

Although two injections of alum-precipitated vaccine have been shown to protect children against whooping-cough (Bell, 1941; Bell, 1948*b*), there is still no proof that the addition of alum *per se* definitely improves the antigenicity of the vaccine (Miller *et alii*, 1944; Miller and Ryan, 1948; Kendrick, 1942; Faragó and Pusztai, 1949; Medical Research Council, 1951).

All we can conclude from the Medical Research Council's investigation is that an immunizing course of at least three injections either of a plain or of an alum-treated vaccine can confer protection, provided the vaccine is of equal potency to those tested.

A definite objection to the use of alum-treated pertussis vaccines is that sterile abscess may follow their use (Medical Research Council, 1951; Bousfield, 1952*b*). Also some authorities fear that they are more likely to be associated with poliomyelitic paralysis than are plain vaccines (Geffen, 1950; Hill and Knowelden, 1950; Bousfield, 1951). For the reasons advanced, it was decided that a plain pertussis vaccine would be used.

The big advantage of precipitated or adsorbed toxoids over fluid toxoids is that fewer injections are required (Patterson and North, 1950; North and Patterson, 1953*a*; North and Patterson, 1953*b*). However, in the present state of our knowledge (Medical Research Council, 1951), three injections of combined immunizing agent containing pertussis vaccine must be given to ensure significant protection against whooping-cough. As three injections of fluid toxoids—both diphtheria and tetanus—produce a satisfactory basic immunity (Lewis, 1941; Bousfield, 1951; Long and Sartwell, 1951), there is therefore no obvious advantage in combining the pertussis vaccine with adsorbed toxoids. Further, as has already been shown, the antigenicity of toxoids is enhanced by the pertussis vaccine.

Preparation of Combined Immunizing Agents.

Mixed Pertussis and Diphtheria Antigen.—The pertussis component is prepared substantially according to the method of Cohen and Wheeler (1946). Briefly, our routine is as follows:

Freshly isolated strains of *H. pertussis* virulent for mice by intranasal inoculation (Burnet and Timmins, 1937) are maintained in the dry state. Dried cultures are transferred to sheep's blood agar slopes containing Cohen and Wheeler base. After forty-eight to seventy-two hours' incubation, the resulting growth is transferred to 200 millilitre amounts of Cohen and Wheeler's medium in Roux bottles. Forty-eight to seventy-two hours later five millilitre amounts of this seed culture are added to further Roux bottles containing 200 millilitres of the same medium. These cultures, which after three or four days' incubation contain upwards of 40×10^9 *H. pertussis* per millilitre, are examined for contaminants and pooled in amounts of four litres. These pooled liquid cultures form the vaccine, after all necessary manipulations including the addition of antiseptic are finished. Toxicity tests on mice are not carried out until the bottles of vaccine have been in the cold room for at least two weeks.

The diphtheria component consists of fluid diphtheria toxoid purified and concentrated by methods previously described (Patterson and North, 1950). The diphtheria toxoid and pyrogen-free physiological saline containing 0·01% sodium ethyl mercuri-thio-salicylate are added to the pertussis component so that the combined product contains 30 flocculation units of diphtheria toxoid, and by the American standard, 20,000 million *H. pertussis* organisms per millilitre. Sterility tests together with safety and potency tests in animals for both components are carried out.

Triple Antigen (Pertussis, Diphtheria and Tetanus).—The pertussis and diphtheria components are similar in every way to those used in mixed pertussis and diphtheria antigen. The tetanus component is tetanus toxoid, purified and refined by ultra-filtration and precipitation (North and Patterson, 1953*b*). Like the diphtheria toxoid used in both combined immunizing agents, the tetanus toxoid is not adsorbed on a mineral carrier. The final mixture is made in just the same way as is mixed pertussis and diphtheria antigen, except that purified concentrated tetanus toxoid is added also, so that triple antigen contains 30 flocculation units of diphtheria toxoid, 10 flocculation units of tetanus toxoid and 20,000 million *H. pertussis* organisms per millilitre. Additional final tests covering the safety and potency of the tetanus toxoid are included.

Potency Testing of the Immunizing Agents.

Potency tests of the diphtheria component both in mixed pertussis and diphtheria antigen and in triple antigen and of the tetanus component in triple antigen are those

specified for fluid toxoids in the 1953 edition of the British Pharmacopœia. They are carried out on the multiple antigens after mixing and call for no special comment.

There is as yet no generally accepted animal protection test for the potency of whooping-cough vaccines. Final proof that the ability of a vaccine to protect mice is a true reflection of its power to protect children is still awaited. The Medical Research Council (1951) is investigating the problem in England, and meanwhile the British Pharmacopœia lays down no laboratory test for potency.

The Americans, however, use the Kendrick method of intracerebral challenge of vaccinated mice (Kendrick *et alii*, 1947). Here injection of immunized mice by the intranasal route (Burnet and Timmins, 1937) is favoured. Potency tests using a large (lethal) infecting dose instilled into the nose (North *et alii*, 1941) suggest that pertussis vaccine prepared in Cohen and Wheeler's liquid culture medium is a good antigen. The details of one such test are shown in Table II.

TABLE II.

Potency Test of Pertussis Vaccines in Mice with Large (Lethal) Intranasal Challenge Dose of H. pertussis.[1]

Group.	Immunizing Agent Tested.	Number of *H. pertussis* Organisms in Vaccine Injected into Mice.	Proportion of Mice Surviving 14 Days following Intranasal Inoculation with Living *H. pertussis*.	Statistical Significance.
A	Mixed pertussis and diphtheria antigen (pertussis vaccine prepared from Cohen and Wheeler culture).	32×10^8	10 out of 21	V. Group B, $P = 0{\cdot}014$ V. Group C, $P = 0{\cdot}003$
B	Pertussis vaccine prepared from Bordet - Gengou culture.	32×10^8	3 out of 23	
C	Nil.	—	2 out of 25	

[1] Mice of groups A and B received a single intraperitoneal injection of immunizing agent, and three weeks later all mice were challenged intranasally with living *H. pertussis* grown in Cohen and Wheeler's fluid medium.

Using a modification (Fisher, 1953) of our original small (non-lethal) infecting dose technique (North *et alii*, 1941), Dr. S. Fisher has carried out tests which tend to confirm the general impression that fluid-grown whooping-cough vaccines should be good immunizing agents. The data in one such test, in which the criterion of protection is the relative failure to cultivate *H. pertussis* from the lungs of mice infected some days previously, are shown in Table III.

However, up to the present we have not developed a standard animal protection test and are still trying out different techniques. Nevertheless, as was mentioned earlier in this paper, enough is already known of factors influencing the antigenicity of whooping-cough vaccines to enable one to feel reasonably sure that a definitely potent vaccine can be prepared regularly. Factors such as the virulence of the cultures used, suitability of growing conditions, the amount of washing and the antiseptics and preservatives used are all important.

Until we have a standard pertussis antigen with which to compare vaccines for potency, and a reliable test for making a comparison, attention to the factors already known to influence their efficacy in humans must be the main safeguard against producing indifferent vaccines.

Clinical Trials with Mixed Pertussis and Diphtheria Antigen and with Triple Antigen (Pertussis, Diphtheria and Tetanus).

The clinical trials with mixed pertussis and diphtheria antigen and with triple antigen include detailed studies on small groups of young children in babies' homes. In addition, both agents have been tested by doctors in private practice for ease of administration and for the absence of undesirable reactions following injection. Further, Dr. S. Sutton, with the cooperation and support of Dr. P. Gilbert, has used mixed pertussis and diphtheria antigen as a routine at baby health centres in the city of Melbourne since late in 1952.

The response to the diphtheria component in several small completed study groups in different babies' homes is shown in Table IV. It was intended to see whether a course of three injections each of 1·0 millilitre was well tolerated. However, as a precaution against the possibility of severe reactions, the first children treated (Group 1) were given a first dose of 0·25 millilitre followed by 0·5 millilitre and 1·0 millilitre of mixed pertussis and diphtheria antigen. It will be noticed (Groups 1, 1*a* and 4*a*) that a considerably reduced dosage is still sufficient to change the Schick status from "positive" to "negative".

Blood was collected from some babies before immunization and from the majority four to six weeks after the last injection of antigen. The serum collected prior to immunization was pooled, and the diphtheria antitoxin titre was found to be less than 0·005 unit per millilitre. The titres of small pools of post-immunization serum ranged from 0·08 to more than one unit per millilitre. All titrations were carried out by the method of Glenny and Llewellyn-Jones (1931).

TABLE III.

Potency Test of Pertussis Vaccines in Mice with Small Intranasal Challenge Dose of H. pertussis (Fisher, 1953).[1]

Immunizing Agent.	Dose of Immunizing Agent Injected into Mice. (Millilitre.)	Number of Mice.	Number of Viable *H. pertussis* Organisms (Six Replicates) in 0·02 Millilitre of Undiluted Extract of Pooled Homogenized Mouse Lungs.	Remarks Regarding Findings in Previous Column.
Pertussis vaccine "A".	0·1	5	More than 200 colonies.	Too numerous to count.
	0·01	5	More than 200 colonies.	Too numerous to count.
	0·001	5	More than 200 colonies.	Too numerous to count.
Pertussis vaccine "B".	0·1	5	More than 200 colonies.	Too numerous to count.
	0·01	5	More than 200 colonies.	Too numerous to count.
	0·001	5	Average of six replicates.	16
Pertussis vaccine prepared from Cohen and Wheeler fluid culture medium.	0·1	5		0
	0·01	5		0
	0·001	5	One colony in six replicates.	0·16
Nil (control).	—	—		Too numerous to count.

[1] All mice except the controls received an intraperitoneal injection of vaccine containing 20×10^7 organisms per millilitre in the amount shown in the second column. Two weeks later all mice were challenged intranasally with about 2250 living *H. pertussis* organisms. After a further seven days mice were sacrificed, and the lungs in each group pooled.

The response to the tetanus component in triple antigen has been studied only in one small series (Groups 4 and 4*a* in Table IV). It was assumed that the tetanus antitoxic content of serum prior to immunization was less than 0·003 unit per millilitre (North and Patterson, 1953*b*). Blood was collected from the babies six weeks after the last injection of triple antigen, and aliquots of the serum were pooled. When tests were carried out by the method of Glenny and Stevens (1938), the titre was found to be between 0·5 and 1·0 unit per millilitre.

No generally accepted skin or laboratory test is available for determining whether children are susceptible to whooping-cough, although some success has been claimed for the opsonocytophagic (Kendrick *et alii*, 1937) and the Phase I agglutinin tests (Miller and Ryan, 1948).

We have been able to detect the presence of protective antibody in the serum of immunized babies by adminis-

TABLE IV.

Schick Status of Infants Before and After Administration of Combined Immunizing Agents Containing Purified Fluid Diphtheria Toxoid.[1]

Group.	Number in Group.	Age of Infants. (Months.)	Immunizing Agent Used.	Number of Injections.	Amount in Each Injection. (Millilitres.)	Interval Between Injections. (Weeks.)	Schick Status.		Remarks.
							Before Immunization.	Two Months After Last Injection.	
1	6	4 to 14	Mixed pertussis and diphtheria antigen.	3	0·25, 0·5 and 1·0	4	All "positive".	All "negative".	
1a	1	13	Mixed pertussis and diphtheria antigen.	2	0·25 and 1·0	8	"Positive."	"Negative."	Had mumps when due for second injection.
2	5	8 to 15	Mixed pertussis and diphtheria antigen.	3	1·0	4	All "positive".	All "negative".	
3	10	8 to 32	Mixed pertussis and diphtheria antigen.	3	1·0	4	All "positive".	All "negative".	
4	6	3 to 8	Triple antigen—(pertussis, diphtheria, tetanus).	3	1·0	4	All "positive".	All "negative".	
4a	1	6	Triple antigen—(pertussis, diphtheria, tetanus).	2	1·0	4	"Positive."	"Negative" (3 months).	Not available when due for third injection.

[1] The numbers of children in the different groups were substantially greater when the studies were commenced than those shown in the second column. The reduction was due to babies being discharged before completion of the injections or the subsequent test. In no case was immunization discontinued owing to severity of reactions.

tering small amounts to mice intranasally and later challenging the animals with virulent *H. pertussis* by the same route (North, 1946). However, the use of a standard reference serum is necessary before such a test can do more than give a rough indication of immunity. We have also demonstrated antihæmagglutinin in the babies' serum (Fisher *et alii*, 1951).

For the present, however, we rely on the protection shown in field trials with similarly produced vaccine (Foley, 1946) rather than on laboratory tests as an indication of the measure of the protection which can be afforded.

A satisfactory feature of the trials so far has been the mildness of the reactions following the injection of either immunizing agent. Some redness and swelling at the site of injection together with a rise in temperature to about 101° F. have been noted in a few young children in the babies' homes. However, these babies have caused the staff no concern, and usually infants have remained perfectly well.

In the large-scale use of mixed pertussis and diphtheria antigen at baby health centres in Melbourne some very young babies had rather sore arms and raised temperatures when given one millilitre in the first dose. However, Dr. Sutton found that by reducing the first dose to 0·5 millilitre in babies under the age of six months these brisk reactions have been almost eliminated.

Doctors in private practice, both pædiatric and general, have reported favourably on their experience with triple antigen. Apart from some sore limbs in the younger babies for about twenty-four hours after a full first dose of one millilitre, reactions have been mild. In no cases, as far as we are aware, have the mothers ceased to cooperate.

Discussion.

The experience recorded above shows that simultaneous immunization of young babies against whooping-cough and diphtheria or against whooping-cough, diphtheria and tetanus can be carried out with relatively little discomfort to the infants and without worry to the doctors or parents. However, the mothers should be warned that some reaction may occur.

As was pointed out earlier, the only guide to the degree of protection afforded against whooping-cough is the experience gained in field trials in which a similar vaccine and dosage schedule to our own has been used.

Diphtheria antitoxin levels after three doses of mixed pertussis and diphtheria antigen, and both diphtheria and tetanus serum antitoxin titres after a similar course of triple antigen, are evidence of a satisfactory basic immunity against diphtheria and tetanus. Higher levels would probably have been obtained if aluminium phosphate adsorbed toxoids had been used (North and Patterson, 1953*a*, 1953*b*), but as the initial course must in any case be followed up by "recall" or "booster" doses to ensure a sustained immunity against both diphtheria and tetanus (McGuiness, 1952; North and Patterson, 1953*a*, 1953*b*), the levels reached may be regarded as adequate.

In Canada (Connaught Medical Research Laboratories, 1952) an initial immunizing course of four injections (including a 'booster' at six months) of diphtheria and tetanus toxoids combined with pertussis vaccine is recommended during the first year of life.

Further "recall" or "booster" single doses are prescribed when the child is eighteen to twenty-four months old, and again when he enters kindergarten. These injections are followed up by a "booster" dose of diphtheria and tetanus toxoids when the child goes to school, and again between the ages of ten and fourteen years.

The Canadian practice is quoted to show the importance placed by some overseas authorities on repeated "booster" or "reinforcing" injections of antigens.

Evidence presented above indicates that three doses of a potent combined immunizing agent such as triple antigen may provide significant protection against whooping-cough until the child is at least three or four years old, and also a solid basic immunity against both diphtheria and tetanus. A "booster" dose of tetanus toxoid about six to twelve months after the primary course is necessary, no matter at what age immunization is started, and a "booster" dose of diphtheria toxoid after the same interval is essential if diphtheria immunization is started early (McGuiness, 1952).

This first "booster" dose may be either 0·5 millilitre of combined diphtheria and tetanus toxoids (C.D.T.) or 1·0 millilitre of triple antigen. It must, however, be remembered that there is little evidence as to the extent to which a single "booster" dose of pertussis antigen augments the protection afforded by a primary immunizing course of vaccine. The greater tendency to reactions following injections, especially repeated injections, of pertussis antigens in older babies should also be considered.

A further "booster", consisting of 0·5 millilitre of C.D.T. is indicated when the child starts kindergarten, and again when it enters school.

If the baby is immunized with mixed pertussis and diphtheria antigen the first "booster" should consist either of diphtheria prophylactic (P.T.A.P.) or of a fourth dose of the mixed antigen. For further "boosters" P.T.A.P. should be used unless the child has been immunized against tetanus separately in the meanwhile, when C.D.T. may be used instead. It would not be sound in the present state of our knowledge (Barr and Llewellyn-Jones, 1953) to use a combined diphtheria and tetanus antigen as a "booster" against diphtheria and at the same time as an agent for carrying out primary immunization against tetanus.

Summary.

The conflicting views regarding the use in young babies of combined immunizing agents, either pertussis-diphtheria or pertussis-diphtheria-tetanus, are reviewed. It is concluded that combined immunizing agents have much to recommend them, provided: (i) that there is evidence that the pertussis antigen is potent and is well tolerated by young babies; and (ii) that the basic course of immunization is followed by a "booster" injection in about six to twelve months' time. The preparation of combined immunizing agents containing pertussis vaccine prepared from fluid cultures of *H. pertussis* is described, together with the experience of clinical trials. The question of later "boosters" is discussed, and it is recommended that "boosters" of diphtheria and tetanus toxoids should be given at kindergarten age and again when the child enters school.

Acknowledgements.

We wish to acknowledge the ready help and cooperation received from the nursing staffs of the Berry Street Foundling Hospital, the Presbyterian Babies' Home and Saint Gabriel's Babies' Home. We are indebted to a number of doctors for using these immunizing agents in their private practices and giving us the benefit of their experience. In particular we wish to thank Dr. S. Wiener, Dr. B. Christophers and Dr. M. McKenna, who have collected the blood samples, given the injections and noted the reactions in children immunized at the babies' homes.

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HÆMATOLOGICAL REACTIONS IN HYPOPHYSECTOMIZED RATS AFTER THE INJECTION OF "AMPARON", CORTISONE AND ADRENALINE.

By L. A. G. HISSINK, M.D.,

From the Department of Pathology, Prince Henry Hospital, Sydney.

WITH the observation of significant degrees of eosinopenic responses in adrenalectomized rats and mice three hours after the intraperitoneal administration of the casein hydrolysate "Amparon" (Hissink, 1953), the question arose whether adrenalectomized rats and mice could be considered to be completely deprived of functions usually attributed to activities of the adrenal glands. Rats and mice which survive bilateral adrenalectomy are most probably, as has already been mentioned in a previous communication, in the possession of mechanisms which at least partly compensate for this loss. However, survival after the removal of both adrenal glands may also indicate that there is no need for these tissues under certain conditions.

It is known that accessory adrenal tissue, made up of cortical or chromaffine tissue alone or of both, and thereby forming adrenals in miniature, is found frequently in rats and mice (Soffer, 1951). Of our series of more than 1000 rats, which were adrenalectomized for different purposes, accessory cortical tissue was found in the periadrenal tissues in about 0·5%. However, accessory cortical tissue may be located in almost every region of the abdominal cavity (Soffer, 1951). Therefore, reactions which have been accepted as reflecting adrenocortical activities in intact animals may also depend upon functions of extra-adrenal "cortical bodies". Although cortical activities of adrenal glands may be the most important factors in reactions such as eosinopenia in intact animals, it does not follow that after bilateral adrenalectomy accessory cortical structures will continue to stay relatively inactive. There is some evidence to the contrary (Speirs and Meyer, 1949). Adrenal cortical tissue regenerates very rapidly (Brownell *et alii*, 1950; Grey and Deane, 1949; Ingle and Higgins, 1938). For that reason it seems unwise to delay more than about ten days after the operation before testing the rats. On the other hand, it must be taken into consideration that animals may still be in the possession of adrenocortical metabolites for the first few days after adrenalectomy (Kumagai and Dougherty, 1951). Kark and Muehrcke (1952) found that adrenaline was able to cause eosinopenia in the absence of adrenals, provided cortisone was present in the body. Adrenalectomized animals, therefore, were tested during a period of between three and ten days after operation.

It is agreed that a small percentage of adrenalectomized rats and mice react with significant degrees of eosinopenia after the injection of adrenaline (Recant *et alii*, 1950; Speirs, 1951; Sayers, 1950). Such reactions may be due to activities of "accessory cortical structures", whether stimulated by the increased release of adrenocorticotrophic hormones from the pituitary gland after this injection or sensitized by such hormones towards this drug (Hissink, 1953). However, there is some evidence for the possibility of more direct effects on the activities of adrenocortical tissues. Vogt (1950) demonstrated that perfused adrenal glands of dogs reacted with increased rates of hormone production after the injection of adenosinetriphosphate (ATP) and related compounds. Similar effects were observed after increase in the potassium concentrations of the perfusing fluids (plasma or serum). It has been reported that adrenaline under certain conditions also has direct stimulatory effects upon the functions of these tissues (Vogt, quoted by Recant *et alii*, 1950). In a similar way, "accessory cortical structures" may respond to these and other influences.

From this point of view it was important to obtain information about the effects of adrenaline and "Amparon" upon activities of accessory cortical structures. If activities of these tissues after "Amparon" injections are more intensive than after the administration of adrenaline, eosinopenia induced by the hydrolysate in animals without adrenal glands could be explained by the involvement of these tissues.

However, one of the difficulties is the uncertainty which exists about the amount of functioning accessory material in adrenalectomized animals. A solution might be provided by comparing the effects of both drugs in animals from which adrenal glands have been removed (Hissink, 1953) with their effects in hypophysectomized animals which are in possession of the normal amount of cortical tissue inside and, if present, outside the adrenal glands. The findings in the hypophysectomized animals would show whether pituitary activities were essential or not for the production of eosinopenic syndromes after adrenaline and "Amparon". If functions of the hypophysis are not involved, then concepts which consider cortical tissues to be important can be based only upon their direct stimulation by the various substances. It was hoped that the significant difference between amounts of available "target cortical tissue" in hypophysectomized rats and amounts of "accessory cortical structures" in adrenalectomized rats would provide a suitable basis upon which quantitative differences could be measured. The amount of available cortical material in hypophysectomized rats does not imply that this tissue is normally responsive (Pickford and Vogt, 1951). On the contrary, it is widely accepted that responsiveness to ACTH, as measured by alterations in the concentration of ascorbic acid in these glands, decreases significantly one or two days after the operation (Sayers *et alii*, 1948). Li and his associates have shown (as quoted by Forsham, 1952) that certain ACTH preparations of varying molecular sizes and without eosinopenic activities may possess a high potency, as measured by the depletion in adrenal ascorbic acid, thereby indicating that dissociated effects on adrenocortical activities and properties are possible. However, it does not seem likely that responsiveness, whether reflected by ascorbic acid levels or eosinopenia *et cetera*, will alter significantly during the first day after removal of the hypophysis.

In the case of adrenalectomy the situation is different. It seems likely that increase in activities of accessory cortical structures after the removal of both adrenal glands is associated with gradually increasing responsiveness.

Experimental Investigation.

Rats (white male Wistar, weighing 100 to 150 grammes) were hypophysectomized under ether anæsthesia. The technique used was that described by Moiomut (1939), but slightly modified. The animals were kept in the laboratory at a strictly controlled temperature of 26° C. to 28° C. and had free access to normal food (Hissink, 1953) and drinking water containing sodium chloride (1%) and glucose (5%). Glucose was added because it has been reported to increase the responsiveness of adrenocortical functions towards ACTH (Wilhelmi and McDonough, 1952; Constantinides *et alii*, 1950). "Amparon" was injected intraperitoneally into 19 hypophysectomized rats on the first day after operation (one millilitre per animal). Hæmatological responses were compared with those observed after the intraperitoneal injection of adrenaline (0·1 milligramme in one millilitre of 0·9% saline per animal) into 15 similarly pretreated animals. Cortisone effects were studied in five hypophysectomized rats (0·6 milligramme in one millilitre of 0·9% saline per rat). Cell counts were performed just before the injections and again three hours after. Eosinophile and other cell counts were made with the same technique as that reported in a previous article (Hissink, 1953). Results from incompletely hypophysectomized animals were discarded.

Hæmatological Reactions: Eosinopenia.

The results of "Amparon" and adrenaline injections may be studied in Figure I (first and second sections). Alterations in the number of circulating eosinophile cells are represented in percentages of the initial counts. These data show that "Amparon" induced in 80% of the cases eosinopenia of between 30% and 85%. The average eosinophile response was −47%. Adrenaline caused in approximately 93% of the hypophysectomized animals eosinophile responses of between +90% and −35%. Only one animal reacted with a drop of 50%. The average response was +7·4%.

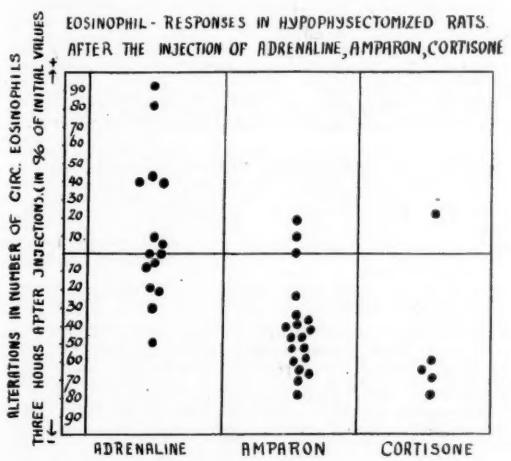
EOSINOPHIL - RESPONSES IN HYPOPHYSECTOMIZED RATS
AFTER THE INJECTION OF ADRENALINE, AMPARON, CORTISONE
ALTERATIONS IN NUMBER OF CIRC. EOSINOPHILS
THREE HOURS AFTER INJECTIONS (IN % OF INITIAL VALUES)
ADRENALINE
AMPARON
CORTISONE

FIGURE I.

Statistics obtained by means of the methods described by Fisher (1946) were as follows: (i) control animals: mean = +7·4% ± 38·4%; (ii) "Amparon"-injected animals: mean = −47% ± 27·3%; $t = 4{\cdot}335$, $N = 32$, $P < 0{\cdot}01$.

Responses after the injection of 0·6 milligramme of cortisone may be studied in the third section of Figure I. It caused in four of the five tested rats eosinophile responses of between −60% and −85%. One rat showed an increase of about 25% in the number of circulating eosinophile cells.

Granulocyte and lymphocyte counts were also undertaken three hours after the injection of the various drugs into hypophysectomized rats. Alterations which took place in the number of circulating granulocytes may be studied in Figure II, in which the first section represents the responses after injection of adrenaline, the second section those after the injection of "Amparon", and the third section those after the injection of cortisone. While adrenaline responses showed granulocytosis, "Amparon" and cortisone reactions

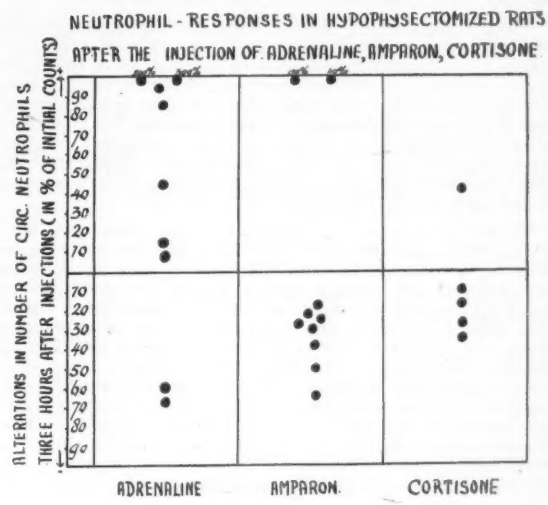
NEUTROPHIL - RESPONSES IN HYPOPHYSECTOMIZED RATS
AFTER THE INJECTION OF ADRENALINE, AMPARON, CORTISONE
ALTERATIONS IN NUMBER OF CIRC. NEUTROPHILS
THREE HOURS AFTER INJECTIONS (IN % OF INITIAL COUNTS)
ADRENALINE
AMPARON
CORTISONE

FIGURE II.

were characterized by granulopenia; "Amparon" induced granulopenic responses of between 20% and 70%, and cortisone responses of between 0% and 40%. In only a few animals were there increases in the number of circulating granulocytes after the injection of either substance.

Lymphocytic responses are recorded in Figure III.

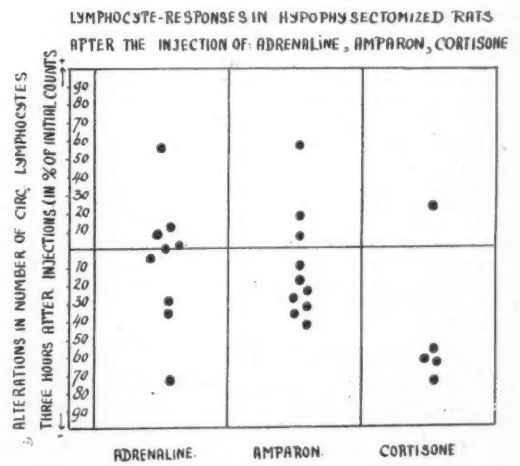
LYMPHOCYTE-RESPONSES IN HYPOPHYSECTOMIZED RATS
AFTER THE INJECTION OF ADRENALINE, AMPARON, CORTISONE
ALTERATIONS IN NUMBER OF CIRC. LYMPHOCYTES
THREE HOURS AFTER INJECTIONS (IN % OF INITIAL COUNTS)
ADRENALINE
AMPARON
CORTISONE

FIGURE III.

It may be seen that there was little difference between the reactions after adrenaline, "Amparon" and cortisone, which all produced slight lymphopenia (more pronounced after cortisone).

Discussion.

The "Amparon"-induced eosinophile responses in hypophysectomized rats three hours after intraperitoneal administration greatly resembled those observed after its

injection into adrenalectomized rats (Hissink, 1953). While the average response in hypophysectomized animals was −47%, that in adrenalectomized rats was −34·5%.

Adrenaline-induced eosinophile responses in hypophysectomized rats also resembled those observed after its administration into adrenalectomized animals. The average response in adrenalectomized rats was −4%, while the reaction in hypophysectomized rats was +7·4%.

These results would indicate that in "Amparon"-induced and adrenaline-induced eosinophile responses in adrenalectomized and hypophysectomized rats, activities of the pituitary or cortical functions in and outside the adrenal glands are not essential. The similarity between hæmatological reactions (eosinophile cells, granulocytes and lymphocytes) after the injection of "Amparon" and cortisone in hypophysectomized and in adrenalectomized rats (Hissink, 1953) supports this view, and suggests that these reactions follow to a certain extent the same pattern.

There is, however, a possibility that responses with eosinopenia after injection of "Amparon" and after injection of adrenaline in adrenalectomized and hypophysectomized rats are reached with a minute amount of stimulated functioning accessory cortical or adrenocortical tissue. The chances of "remnants" of pituitary tissue interfering with responses after hypophysectomy proved to be much smaller than those of accessory cortical bodies doing so in adrenalectomized animals. Such responses would apply mainly to direct stimulatory effects of the various drugs on adrenocortical and accessory cortical tissues in hypophysectomized rats. In adrenalectomized rats, direct as well as indirect stimulatory properties (mediated via pituitary activities) could have been involved.

The difference of 55% between eosinophile responses after "Amparon" and adrenaline was much greater in hypophysectomized rats than the difference of 30% between these responses after the same drugs in adrenalectomized animals. The respective *P* factors were less than 0·01, and between 0·02 and 0·01. This result suggests two things: (*a*) The presence of pituitary-mediated and therefore indirect stimulatory effects on accessory cortical activities in adrenalectomized animals after the injection of adrenaline. These effects were abolished in hypophysectomized rats. (*b*) The presence of direct stimulatory effects on adrenocortical and accessory cortical activities in hypophysectomized rats, and possibly on accessory cortical activities in adrenalectomized rats, after the injection of "Amparon".

It may be worth while to study "Amparon" for adrenocorticotrophic properties with the adrenal ascorbic-acid depletion tests (Sayers *et alii*, 1948).

The granulopenia in hypophysectomized rats, as compared with the granulocytosis in adrenalectomized animals (Hissink, 1953), after the injection of "Amparon" or cortisone directs attention to activities of the pituitary gland in responses with an increase in the number of circulating neutrophile cells. It seems that these pituitary activities are essential for such responses after "Amparon" or cortisone. This is consistent with the fact that ACTH gives rise to granulocytosis (Dougherty and White, 1944; Monto *et alii*, 1952).

It has also been reported (Weisberber and Levine, 1952; Mogabgab and Thomas, 1952; Gell and Hinde, 1951; Godlowski, 1952) that cortisone administration is associated with a decrease not only in the number of circulating eosinophile cells and lymphocytes, but under certain conditions also with a diminution in the number of circulating granulocytes. Such granulopenic effects may be camouflaged in most instances by "secondary" increased outputs of granulocytes from the bone marrow and other sources.

With regard to the "lymphopenic" responses, it is known that adrenaline injected in suitable amounts into hypophysectomized animals is able to induce such reactions (Hungerford, 1949). It could indicate that adrenaline stimulates the secretion of cortical steroids, concerned with lymphopenic responses, by a direct action on the adrenals, or that it acts directly on the lymphocytes in the presence of a small titre of hormone which is generally accepted to be present in hypophysectomized animals. Apparently the adrenal cortex, without being stimulated by pituitary metabolites, is able to release continuously some steroid material (Sayers, 1950).

Summary.

Eosinopenic, granulopenic and lymphopenic reactions in hypophysectomized rats after the injection of "Amparon" show a resemblance to reactions observed after cortisone injections into similarly pretreated animals. There is a difference in reactions observed after the injection of adrenaline and "Amparon" into these rats. The possible adrenocorticotrophic activities of "Amparon" are discussed.

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A NEW CATHETER SYRINGE.

By R. J. SILVERTON,
Sydney.

SHORTLY before the outbreak of the second world war I worked out the design for an improved catheter syringe, but found it was impossible at that time to have it made. This difficulty continued for some time after the end of the war, but several years ago I submitted the design to a surgical instrument firm in Sydney, who undertook the work and made the syringe satisfactorily. After a few primary alterations the design reached finality and during the last three years I have not found it necessary to alter the shape of the metal nozzle which is the fundamental part of the instrument.

For many years the need has been felt for a light, easily handled syringe, by which a nurse, with her small woman's hand, could fill and empty a bladder with the right hand alone while the left controlled the butt-end of the catheter. For this reason, and for reasons of economy, I decided to use a specially designed metal nozzle, cemented on the end of an English 20 cubic centimetre all-glass syringe, after the nozzle-bearing face had been cut away. To the butt-end of the glass plunger a half-ring metal thumb-piece was fitted, so that, with the right hand alone, the nurse could fill the syringe and then discharge its contents into the bladder.

At the present time irrigation of the bladder for antiseptic purposes is generally considered to be unnecessary. With good fluid intake and antibiotic cover the chief value of a good syringe is to remove blood clots or other semi-solid matter from the bladder; if they are left to lie and cannot easily escape through the draining tube or tubes, they may become infected, and in any case they act as foreign bodies causing irritation and spasm, sometimes with increase in bleeding.

I had to design the nozzle of this instrument in such a way as to obturate perfectly the trumpet-end of any commonly used catheter, large or small, the variation being from 6E (15F) to 13E (24F). Moreover, the nozzle had to be able to obturate drainage tubes, such as cystostomy and nephrostomy drains, up to 28F.

A great advantage of perfect obturation is that filling of the balloons of Foley retention and hæmostatic catheters is rendered easy and sure. During this manœuvre great pressure is generated in the balloon and its filling channel, so without good obturation squirting by reflux around the syringe nozzle easily occurs, with consequent uncertainty as to the state of distension of the balloon. The conical principle, as in the loose nozzle of the Toomey syringe, does not ensure perfect obturation, but an olivary or bulbous swelling does, and I found by experimentation that the widest point of the bulb should be at eight millimetres from the tip of the nozzle in order to be in the handiest position.

The tip of the nozzle has an external diameter of four millimetres, that of the bulb being eight millimetres at its widest part. After the narrowing behind the bulb the nozzle expands conically until it is 10 millimetres in outside diameter at its base. If the whole of the nozzle is used for obturation, if necessary, any catheter or drainage tube trumpet in common use can be obturated.

The other problem to be solved was that of the internal diameter of the nozzle, which I made uniform throughout its length. The widest bore I could secure consistent with keeping the outside diameter of the tip small enough for fine catheters was 3·5 millimetres. However, this is sufficiently large for the removal of moderately sized clots. If the nurse cannot keep the bladder free with this bore, it is better for the surgeon to take a hand himself, insert a panendoscope or resectoscope and remove the clots by means of a Toomey syringe. This kind of work is the special value of the large-bore Toomey instrument, but it is not so useful in the role of catheter syringe.

For post-operative care, when some degree of bleeding is to be expected, the nursing method I teach is for the left hand to control the catheter while the syringe work is done entirely with the right. Three or four successive fillings (60 to 80 cubic centimetres) of the syringe are discharged into the bladder; then the right thumb makes a firm and quick pull to suck out clots. This manœuvre is repeated, a simple clear lotion such as boric solution being used, until no more clots come away, when the patient is left alone. All that is necessary is to make sure that the catheter is draining. Syringing should be carried out as often as necessary, but as little as possible. The less interference there is with the bladder, the better.

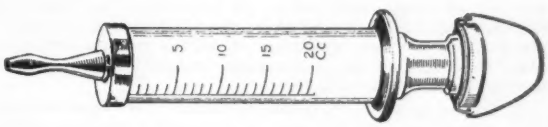

FIGURE I.

Foley catheters should gradually come into general use by all branches of the profession when bladder drainage may be required, for they cause hardly any urethritis and can be left unchanged for long periods with safety. The patient is more comfortable than with a red-rubber catheter; but their chief disadvantages have been their cost and the unreliability of the balloon if it is not new, as well as the difficulty of accurate filling of the balloon. The disadvantage is removed if this syringe is available.

Another use of the syringe is for urethral injections. The olivary swelling will obturate the external meatus in both sexes and in most patients. When the meatus is rather large the whole nozzle can be inserted into the urethra so that the wide base of the nozzle obturates the meatus. The chief uses of a urethral syringe nowadays are (*a*) to instil local analgesics and (*b*) in the making of urethrograms.

SOME ASPECTS OF PROLONGED GESTATION.

By GORDON D. LEY,
The Women's Hospital, Melbourne.

FROM the obstetrician's point of view, the chief problem in cases of prolonged gestation is to determine whether induction of labour is justified. This question can be satisfactorily answered only if we have some accurate indication of the risks which attend prolongation of the gestation, so the present investigation was undertaken in an attempt to gain some information on this point.

No unanimity exists as to which cases should be classified as of post-maturity, and there is wide variation in the standards adopted. Gestation times exceeding the average by seven days (McKiddie), ten days (von Rutte) or fourteen days (Clayton) have been regarded by various authors as indicating post-maturity. Others (Boe, Kortenoever, Malpas, Wrigley) adopt more complicated criteria and take cognizance of such factors as birth weight or length of the fœtus, amount of *vernix caseosa* present, and amount and character of the *liquor amnii*. At the Women's Hospital, Melbourne, there has been a tendency to disregard duration of pregnancy and to use the term "post-mature" only in cases in which the new-born showed the following characteristics: dry peeling skin, excessively long finger nails, small amount of subcutaneous fat, increased length in relation to body weight. In some cases fœtal death before or during labour was regarded as characteristic, and in others, neo-natal feeding difficulties. These findings are said usually to be associated with a reduction in the amount of *liquor amnii*, which is often turbid, dark-coloured and of thick consistency.

Without entering into any discussion of the merits of these various standards, it may be stated that for the purposes of this investigation cases of post-maturity were

those in which the gestation, dating from the first day of the last menstrual period, lasted 294 days or longer.

Obviously, in such a study, in which the last menstrual period is to be used as the starting point for the calculation of maturity, it is necessary to take all possible precautions to ensure accuracy of this date. For this reason many patients were excluded from the series at the interview on their first attendance at the ante-natal clinic, most of them because of irregular or uncertain menstrual history. Patients with regular menstrual history were also excluded if the usual interval was greater than thirty-five days, lest their inclusion lead to a false increase in the number of cases regarded as of post-maturity. This, of course, was necessary because the variable proliferative phase of that menstrual cycle in which conception takes place is included in estimating maturity by the only method generally available.

A few cases were excluded in which there was obvious discrepancy between the size of the uterus and the period of amenorrhœa, but no attempt was made to exclude cases simply because of complications present or likely to develop.

The 643 patients thus selected were followed through their ante-natal course and labour, and can be divided into three groups according to the manner of termination of their pregnancy: (i) spontaneous delivery after less than 294 days' amenorrhœa, 430 cases; (ii) induction of labour or elective Cæsarean section after less than 294 days' amenorrhœa, 143 cases; (iii) delivery after 294 days' amenorrhœa or more, 70 cases. The second group will not be further considered, and some comparisons will be made between the first and third groups. It is believed that the proportion constituted by the third group, about 11%, gives a fairly accurate idea of the incidence of prolonged gestation. In an unselected series the incidence would appear to be higher, because of the inclusion of patients with long or irregular menstrual cycles.

It was thought that some women may repeatedly have prolonged gestation periods. Accordingly, *multiparæ* with post-mature babies were questioned as to their previous gestation periods, and after close interrogation information was obtained about 40 previous babies. Of these, 12 were born before or on the expected date of confinement and 28 were born after or on the expected date of confinement; of the latter group, 16 babies were born fourteen or more days later than expected—that is, two-fifths of the babies whose data were available. This suggests that in some women at least prolongation of pregnancy constitutes a recurrent problem.

Of greatest interest in the series is the stillbirth and neonatal death rate, shown in Table I.

In the non-post-mature cases the causes of fœtal death were as set out in Table II.

The two fœtal deaths in the post-mature group are of special interest. The details may be summarized as follows.

CASE I.—The mother was a *nullipara*, aged twenty-seven years, who had had 301 days' amenorrhœa. She had been in labour for fifty hours, and had vomited during the last thirty-six hours. The fœtal heart sounds disappeared during labour, about seven hours before delivery. The birth weight of the fœtus was eight pounds seven ounces, and the length 21·5 inches. Autopsy revealed "intra-uterine asphyxia". The placenta was deeply stained with meconium and some infarction was present.

CASE II.—The mother was pregnant for the fourth time and was aged twenty-nine years; she had had 302 days' amenorrhœa. In her first pregnancy labour had been induced when confinement was fourteen days overdue, in the second pregnancy confinement was two days overdue, and in the third pregnancy confinement was seven days overdue and the baby was stillborn. On the fourth occasion she had a thirteen-hour labour, during which the fœtal heart sounds disappeared. The birth weight of the fœtus was nine pounds one ounce and the length 22 inches. The *liquor amnii* was thick and olive-green, and normal in amount. There was no gross infarction in the placenta. The post-mortem diagnosis of the causes of death was: "Intra-uterine asphyxia. Post-maturity."

Some points of similarity about these deaths are worthy of remark. Both babies were large, and death occurred during labour, in both cases the *liquor amnii* was of thick consistency and of dark green colour, and in neither was there satisfactory anatomical explanation of the death.

The changes in the *liquor amnii* observed in these cases are of interest, in view of what has been said concerning the Women's Hospital conception of post-maturity.

Skin Changes in the Newborn and Post-maturity.

An attempt was made to show statistically whether there was any association between post-maturity and dryness and peeling of the skin in the early days of life, and babies were grouped according to the degree of these changes, if any. The skin state was noted in 343 cases: no abnormality was noted in 241, and abnormality was present in 102. Dry hands and feet were present in 50 cases (average gestation period 282·7 days); minor patchy scaling was noted in 23 cases (average gestation period 287·3 days); moderate scaling was noted in 19 cases (average gestation period 289·5 days); widespread scaling was noted in 10 cases (average gestation period 294·0 days). These figures strongly suggest a relation between dry peeling skin and prolonged gestation.

TABLE I.

Subjects.	Neonatal Deaths.	Stillbirths.	Total.
Post-mature (70) ..	—	2	2
Other (430)	4	5	9

Induction of Labour.

As the post-mortem examination of the two dead babies in the post-mature group failed to reveal any anatomical cause of death, the question must arise as to whether induction of labour would not have been advisable, and if such induction should not be the rule in post-maturity.

Surgical induction of labour carries a considerable risk to the fœtus, mainly from prolapse of the cord and intra-uterine infection.

TABLE II.

Neonatal Deaths.		Stillbirths.	
Cause.	Number of Cases.	Cause.	Number of Cases.
Erythroblastosis	1	Anencephaly	1
Intracranial hæmorrhage	1	Erythroblastosis	1
Congenital abnormalities	1	Intracranial hæmorrhage	1
Prematurity and atelectasis	1	Maceration of fœtus ..	2
		((i) Bad obstetrical history—4 miscarriages. (ii) Following and possibly due to a fall.)	

In view of the low mortality rate in the present series, routine surgical induction of labour could not be recommended in post-maturity, especially as an unselected series would include many cases in which the prolongation of pregnancy is only apparent. Surgical induction of labour might be indicated in selected cases if some signs or symptoms which predicted subsequent fœtal loss could be found during the ante-natal period.

No such helpful phenomena were found, but four possible factors were investigated because of the frequency with which they are mentioned as being of ill omen in post-maturity.

Age of Patient.

It has been stated that post-maturity confers greatest risks upon the babies of elderly patients (von Rutte). In the 70 cases of prolonged pregnancy in this series, only two mothers were aged over thirty-five years (one forty

TABLE III.

Fœtal Activity.	Post-Mature Subjects.		Other.		Total.	
	Primigravidæ.	*Multigravidæ.*	*Primigravidæ.*	*Multigravidæ.*	*Primigravidæ.*	*Multigravidæ.*
Increase in activity	7	16	32	72	39	88
No change in activity ..	4	5	44	52	48	57
Decrease in activity	6	6	34	60	40	66

years, the other thirty-nine years), and in neither case did trouble ensue. On the contrary, the fœtal deaths occurred in cases in which the mothers were aged twenty-seven and twenty-nine years respectively.

Maternal Weight Changes.

Loss of maternal weight in the late weeks of pregnancy has been said to indicate a bad fœtal prognosis in these cases. This was thought to be brought about by absorption of fœtal subcutaneous fat and by reduction in the amount of *liquor amnii*, both associated with waning placental function. Relative to this point, information is available in 52 cases. Between the last two weighings in the ante-natal department changes were as follows: gain, 37 cases; no change, six cases; loss, nine cases. Loss of weight, then, occurred in nine out of 52 cases, and these nine cases included both mothers of the stillborn babies. However, alterations in maternal weight at this stage of pregnancy have to be accepted with caution, because of the possibility that early preeclampsia, or its treatment by dietetic or diuretic methods, may be responsible for the variations. The mother of one of the stillborn babies weighed 217 pounds at her last pre-confinement visit (eight pounds lighter than four weeks previously); but she had recently begun to adhere enthusiastically to a reducing diet.

Maternal Girth Measurement.

Diminution in maternal girth from reduction in size of the uterine contents has been said to be a bad prognostic sign in post-maturity.

Experiences in measuring girths were not happy, and some wildly fluctuating figures were achieved. Alterations in the measurement can be produced by minor change in position of the mother or of the baby, or in the level of application of the tape measure. The tonic state of the uterus is of importance, and perhaps most difficult of all to control is the amount of tension applied to the tape.

The following figures were obtained: increase, 22 cases; no change, eight cases; decrease, 13 cases. Both women who had stillborn babies were measured in the last few weeks of their pregnancy. For one irregular figures were obtained, the other's figures were fairly constant, but in both a decrease in the measurement of about one inch occurred in the last week. In view of the frequency with which a fall or no increase in girth over the last weeks was followed by birth of a normal child, this measurement is not considered helpful for our present purposes.

Fœtal Activity.

A fourth factor which is said to occur as a forerunner of fœtal death or morbidity is diminution of fœtal movements in the weeks preceding the onset of labour. To check this point, interrogation of mothers concerning intra-uterine fœtal activity was carried out within a day or two after delivery, and the following results were obtained (Table III).

Of the two cases of fœtal death, in one the movements did not alter, in the other there was a diminution.

Other Considerations.

The significance of these four sets of figures is considered to lie not in their relation to the cases of fœtal death, but in the frequency with which these signs occur in cases which have a normal outcome.

A few pregnanediol estimations were made in this series, but the results were not conclusive and will not be produced here. No estimations were made in the case of the stillbirths.

A further point which deserves consideration is the increased likelihood of disproportion, and in the present series average birth weights were as set out in Table IV.

TABLE IV.

Mothers.	*Post-mature* Subjects.	*Other* Subjects.
Primigravidæ ..	7 lbs. 11 oz.	7 lbs. 3 oz.
Multigravidæ ..	8 lbs. 5 oz.	7 lbs. 10 oz.

This difference in average birth weight between mature and post-mature subjects is suggestive, though not statistically significant, and lends weight to the conclusions of those writers on the subject (Clayton, Latto, Hayes) who believe that disproportion is the only or chief problem of importance associated with prolonged gestation. However, when this aspect was followed further, there was no significant increase in the incidence of operative delivery, which was 14% in the post-mature group against 13% in the remainder. There were one "failed" trial of labour in the post-mature group and three in the non-post-mature group.

The following facts appear:

1. There is an increase in the incidence of fœtal death in post-maturity. This is even more pronounced (two deaths in 23 cases) if periods of amenorrhœa greater than 300 days are considered.

2. No signs or symptoms to give warning of impending fœtal death were found, and some which have been thought to be of value have been shown to be of little help.

3. Post-mature babies tend to be heavier than the average.

Conclusion.

This leads to the following recommendations for cases of post-maturity:

1. No treatment should be given to patients close questioning of whom at the first ante-natal visit has failed to yield an accurate starting point for the pregnancy. Suitable correction should have been made for variations in the menstrual cycle.

2. It is recommended that medicinal stimulation with pituitary extract be used during the third week after the expected date of delivery. Medicinal stimulation is not entirely without risks, the greatest being the induction of unsatisfactory labour in the ill-prepared uterus and premature rupture of the membranes without onset of labour (Hayes). It is thought, however, that these risks are slight and are well balanced against two factors on the other side of the ledger. Firstly, a baby may sometimes die because of the prolongation of pregnancy. Secondly, the mental state of the mother usually warrants, and occasionally demands, consideration in these cases. Apprehension and depression often cloud her mind, and considerable relief may follow even "failed" medical induction, provided the possibility of failure is impressed on her beforehand. Repeated stimulation should not be used at intervals of less than an arbitrary period of a week, and it is important to guard against the attitude of mind which may regard failure as an indication for surgical induction of labour.

3. Surgical induction of labour is not recommended as a routine treatment for prolonged gestation because of the risks of infection, prolapsed cord and failure of induction, and because disproportion may be present. Another possible effect is that further reduction of the placental circulation following efflux of the *liquor amnii* may lead to a fatal result if there already exists a degree of placental insufficiency. Surgical induction of labour is indicated only in patients who have had a previous prolonged pregnancy with unexplained fœtal death before or during labour, and in patients who show signs of preeclampsia. Even in cases in which the toxæmia is mild and would not warrant induction of labour if it was found before the expected date of delivery, labour should be induced when there is reasonable certainty that maturity has been reached.

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Reports of Cases.

NEUROMYELITIS OPTICA TREATED WITH CORTISONE: REPORT OF A CASE.

By R. HERTZBERG, F.R.A.C.S.,
Sydney.

NEUROMYELITIS OPTICA (Devic's disease) is a rare disease, which is manifested as a rule by the sudden onset of binocular loss of vision often followed by a severe rapidly ascending inflammation of the cord, and terminating in death.

The most complete review of the disease in the literature is that of Stansbury (1949). In addition to reviewing the literature he added five new cases and described the pathology of the disease. More recently Scott (1952) reviewed the literature and reported ten further cases.

The disease occurs in both sexes and probably also at any age, although as a rule young adults are more prone to it. In reported cases the age has varied from nine to sixty years. Generally it occurs in a previously healthy young adult, and is ushered in by sudden loss of vision in one eye followed in a day or two by loss of vision in the other eye. In an equal number of cases spinal cord symptoms appear before the ocular symptoms. Cases have been reported in which binocular visual loss has not been followed by paraplegia. These are abortive cases of *neuromyelitis optica* (Walsh, 1947).

There is no specific treatment, the most important measure being good general nursing for patients in whom paraplegia develops.

The prognosis is bad, the expected death rate being 50%. However, it is difficult to form an accurate estimate of the mortality rate in this syndrome, because the diagnosis is uncertain in cases in which recovery occurs (Stansbury, 1949).

Recently, Smith (1951) reported two cases of bilateral transverse optic neuritis treated with cortisone, and Smith (1952) also reported one case in which corticotropin was given intravenously. The outcome was favourable in the three cases.

Because of the rarity of the disease and the favourable response to cortisone I am prompted to report the following case, which in addition is remarkable by virtue of the age of the patient.

Clinical Record.

Mrs. S., aged sixty-six years, was first examined on September 2, 1952. Four days previously she had noticed that her vision was blurred and hazy, and the next day her vision was such that she was unable to walk about. One month previously she had had what she called influenza accompanied by headache. Since then and up to the time of examination she had been well.

On examination of the patient, the pupils were dilated and fixed. The ocular movements were full and there was no nystagmus. Both globes were tender to pressure. The visual acuity was less than 6/60, and with both eyes with correction her visual acuity was just 6/60. The visual fields appeared to be contracted on confrontation testing. Apart from "muzziness" on the nasal side of each disk, the fundi appeared normal.

She was admitted to hospital the next day. Physical examination was non-contributory. X-ray examination of the skull and nasal sinuses revealed no abnormality. Lumbar puncture produced clear fluid under normal pressure. There were no cells in the cerebro-spinal fluid, and the Wassermann test and colloidal gold test produced negative results. A full blood count revealed no abnormality.

On the patient's admission to hospital, penicillin was given, 1,000,000 units by intramuscular injection every six hours, vitamin *B* complex, one cubic centimetre per day, and cortisone, 100 milligrammes every eight hours for three doses, every twelve hours for two doses, and then once a day. Penicillin therapy was continued until 30,000,000 units had been given, and cortisone by the parenteral route until one gramme had been given, and this was followed by "Cortone" tablets until another gramme had been given. The vitamin *B* therapy was continued until the patient's discharge from hospital on September 20, 1952, when she continued with vitamin *B* complex taken orally.

The patient's course in hospital and subsequently was as follows. On September 5 she thought that her vision had improved, and the next day—that is, the fourth day of treatment—her pupils were small and reacted briskly. The visual acuity with correction was 6/18 in the right eye and 6/24 in the left eye, and she could read Jaeger type 4. During the next fourteen days in hospital the visual acuity fluctuated, being better in the morning than in the evening. On October 1 the visual acuity was 6/9 in each eye, and she could read Jaeger type 2.

On November 26 the visual acuity was still 6/9 in each eye. Examination of the optic disks revealed pallor of the temporal halves, the pallor being more pronounced in the left disk.

The patient wrote on March 20, 1953, stating that she was well; obviously, up till that date there had been no transverse myelitis affecting the cord.

Comment.

The occurrence of bilateral loss of vision of rapid onset with fixed dilated pupils is almost pathognomonic of *neuromyelitis optica* (Brain, 1930). This picture is rarely seen in disseminated sclerosis. In addition the absence of nystagmus or muscle palsies and the patient's age rule out disseminated sclerosis in the case described.

The effect on the disease of treatment of any kind is very difficult to evaluate. Walsh (1947) described three cases of abortive *neuromyelitis optica* in which useful vision returned.

V. L. Smith (1951), in his discussion on two cases, in which there were no spinal cord symptoms, makes the suggestion that the administration of cortisone may have

been responsible for the arrest of the disease before myelitis developed.

In the case described above there were no spinal cord signs at any time, and response to treatment and return of vision were rapid. Although the improvement may have been coincidental in all cases reported, the use of cortisone in similar cases is justified until it can be demonstrated whether or not cortisone is of benefit.

Summary.

A case of transverse optic neuritis in a female patient, aged sixty-six years, is presented. There were no other neurological signs. The patient made a quick recovery, cortisone having been administered. Attention is drawn to the successful use of cortisone in three other similar cases, and it is suggested that cortisone be administered in all such cases until such time as its value is definitely established.

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A RARE SURGICAL EMERGENCY: TORSION OF SPERMATIC CORD WITH FULLY DESCENDED TESTIS.

By JAN J. SAAVE, M.D.,

Rabaul, Territory of Papua and New Guinea.

THE case to be reported is of interest because of the comparative rarity of the condition and the unusual clinical findings. Among 23,061 native patients admitted in the last three years to the Rabaul Native Hospital, this was the only case encountered.

Clinical Record.

A male New Guinea native of Rabaul sub-district, aged approximately thirty-three years, was admitted to hospital at 3.30 p.m. on August 11, 1952, suffering from dull abdominal pain. He had been well until two days before, when he felt a sudden sharp colicky pain in the left groin. He was lifting a heavy bag of copra at the time. Soon afterwards he vomited several times, and had frequent, watery motions. After twenty-four hours the vomiting and watery stools had stopped. He developed a tender swelling in the groin, was thirsty, and complained of "burning skin" to his relatives. The acute pain had begun to subside in the last twelve hours. His health had always been good, and he had had no serious illness except the usual attacks of "malaria".

On examination, the patient was mentally alert but depressed. His temperature was 101·4° F. (38·5° C.); his pulse rate was 120 per minute, and the pulse was of poor volume, but equal and regular. The respirations numbered 26 per minute. His blood pressure was 100 millimetres of mercury, systolic, and 80 millimetres, diastolic. The abdominal wall was found tense, especially over the left iliac fossa. The abdominal reflexes could not be elicited. On palpation the spleen and liver were not felt. On auscultation the abdomen appeared to be "silent". There was a lump in the left groin approximately three inches (75 millimetres) in diameter, tender to touch, and firmly fixed at its base. The left testicle was felt in the swollen scrotal sac. It was œdematous and tender. The right testicle appeared normal.

The diagnosis of a left strangulated hernia with congestion of pampiniform plexus was made, and the patient was operated upon under general anæsthesia on the same afternoon.

At operation, the parainguinal incision disclosed bluish discoloration underneath the aponeurosis of the external oblique. The left spermatic cord from the internal inguinal ring formed an indistinguishable hæmorrhagic mass, with the congested testicle blue-black in colour on its end. The floor of the inguinal canal was discoloured and œdematous. The cord was isolated in the usual manner, transfixed at the internal inguinal ring and severed. The hæmorrhagic mass was then removed *in toto*. The incision wound was closed.

Post-operative recovery was uneventful. The patient received one gramme of streptomycin by intramuscular injection for three days twice a day, and the usual quinine as a malaria suppressive. *The post-operative diagnosis was* torsion of the spermatic cord with fully descended left testis.

Discussion.

As gangrene had set in, the post-operative examination of the specimen was not instructive. It could, however, be assumed that no evident tumours of testis or epididymis were present. There was no history of any previous swellings or lumps.

The anatomical relationship between the testis and its attachments in cases of torsion was described by Muschat (1932). He stressed the fact that structural variations such as spiral attachment of the cremaster and high sac-like enclosure of the cord and testis by the *tunica vaginalis* are actual predisposing causes.

Bailey (1936) has confirmed this view and expressed doubt whether twisting would occur in an anatomically normal testis.

Pessin (1948) stated that free mobility and high attachment of the testicle are found in such conditions as large or open *tunica vaginalis*, absence of scrotal ligaments, *gubernaculum testis* or posterior mesorchium, elongation of the *globus minor* and abnormal attachment of the common mesentery and vessels to the *globus minor* and lower pole of the testicle.

The sudden muscular strain as revealed in the history appears to be an exogenous factor of only limited value.

The actual difficulty of establishing a correct diagnosis was the close resemblance to acute epididymo-orchitis (pyrexia, tender testis, inflammation of scrotum and spermatic cord). The absence of acute abdominal pain can be explained by the fact of supervening gangrene of the cord. On the other hand, it was hardly possible to distinguish on clinical grounds only between strangulated inguinal hernia and twisting of the spermatic cord.

Summary.

A case of spontaneous torsion of a fully descended testis with commencing gangrene of the spermatic cord is presented. The diagnosis was difficult, as the condition closely simulated strangulated hernia with congestion of the pampiniform plexus, and it resembled acute epididymo-orchitis of unknown origin. Left orchidectomy was performed, as the testis appeared to be lifeless, and untwisting of the cord was contraindicated. The treatment for the above-described condition can be surgical only.

Acknowledgements.

I should like to thank Dr. J. T. Gunther, Director of the Public Health Department, Territory of Papua and New Guinea, for his permission to publish this case. It is a pleasure also to express my appreciation to Mr. R. K. Wilson, F.R.C.S. (England), and Dr. C. Salemann for their help.

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Reviews.

Biochemistry in Relation to Medicine. By C. W. Carter, M.A., B.M., B.Ch., and R. H. S. Thompson, M.A., B.Sc., D.M.; Second Edition; 1953. London: Longmans, Green and Company. Melbourne: Longmans, Green and Company. 9″ × 6″, pp. 536, with 36 text figures. Price: 52s. 6d.

THE authors state that the aim of this book is to present those aspects of biochemistry which are significant in medicine. Probably no two people will agree as to what aspects of biochemistry are of particular significance in medicine, what parts to stress and what to touch lightly or omit. In this second edition the authors have apparently felt this difficulty and have added considerably to the first edition. This is a good but not an outstanding text-book; for the most part it covers the ground adequately if in somewhat dull style.

At the end of most of the chapters there is an experimental section with a good range of experiments. These are out of place in a textbook. The authors state that they have included experimental sections at the end of each chapter in the hope that by presenting both theoretical and practical aspects of the subject side by side they may be able to bridge the gap which too often exists in the student's mind between theoretical knowledge and practical work. But surely this is the function of the good teacher in the practical class.

Ciba Foundation Colloquia on Endocrinology. Edited by G. E. W. Wolstenholme, O.B.E., M.A., M.B., B.Ch., assisted by Margaret P. Cameron, M.A., A.B.L.S.; 1953. Volume 5. Bioassay of Anterior Pituitary and Adrenocortical Hormones. London: J. and A. Churchill, Limited. 8½″ × 5½″, pp. 244, with 53 illustrations. Price: 25s.

VOLUME V of the "Ciba Foundation Colloquia on Endocrinology" contains papers and discussions on various aspects of the determination of hormones from the anterior pituitary and the adrenal cortex. There are twelve papers with discussion on the assay of anterior pituitary hormones, three on ACTH and six on adrenocortical hormones. The papers are all by well-known workers in the field in Europe and America and cover the ground very completely. They are, of course, highly technical and could be of little interest to other than laboratory investigators in endocrinology, chemical pathologists, biochemists and physiologists.

Lectures on the Scientific Basis of Medicine. British Postgraduate Medical Federation, University of London; 1953. Volume I, 1951-52. London: University of London: The Athlone Press. Sydney: Walter Standish and Sons. 9″ × 6″, pp. 404, with six plates and 85 text figures. Price: 30s.

A SERIES of lectures on the scientific basis of medicine, arranged each winter by the British Postgraduate Medical Federation, is designed to help the listeners to realize the fundamental advances that are being made in other fields than their own and the possible influence of these advances on their own work. Eighteen of the lectures delivered during the winter of 1951-1952 are included in the first volume of "Lectures on the Scientific Basis of Medicine". The lectures selected for this volume "bring up to date the progress that is being now made in a subject against a background of its earlier advances, and explain the newer methods by which progress has been possible". The lectures are "intended especially for the younger research workers and teachers in the preclinical and clinical sciences and for junior clinicians who hope to find careers as consultants and teachers in the various special branches of medicine and surgery", but any medical man, desirous of keeping himself up to date, will find a great deal of interest and value in this volume.

The range of subjects covered is large and the lecturers are all outstanding in the various fields. The subjects dealt with include adrenal hormones, mammary function, cortical mechanisms, hæmorrhage, blood pressure, visual sensation, tissue response to injury, kidney function, antibacterial immunity, viruses, blood coagulation, aging, adolescent growth, nutritional assessment and effects of radiation.

If this volume gives an indication of what is to come in future volumes, the series will be extremely useful to all medical men who wish to keep in touch with progress in medical research.

Ophthalmic Pathology: An Atlas and Textbook. By Jonas S. Friedenwald, Helenor Campbell Wilder, A. Edward Maumenee, T. E. Sanders, John E. L. Keyes, Michael J. Hogen, and W. C. and Ella U. Owens, with the editorial assistance of Helen Knight Steward; 1952. Published under the joint sponsorship of The American Academy of Ophthalmology and Otolaryngology and The Armed Forces Institute of Pathology. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical), Limited. 11½″ × 8″, pp. 498, with 240 illustrations. Price: £8 11s.

THE publication of this atlas and text-book of ophthalmic pathology by the American Academy of Ophthalmology and Oto-rhino-laryngology and the Armed Forces Institute of Pathology marks a milestone in the progress of American ophthalmology. An editorial staff, under the guidance of J. S. Friedenwald and H. C. Wilder, with Verhoeff and Reese, amongst others, as consultants, could not fail to produce a work of outstanding merit.

The first eighty pages are devoted to a brief description of the normal anatomy and physiology of the eyeball and to a discussion of general pathological principles. The remainder is compiled from a study of the "specimens and records contributed by ophthalmologists over a period of thirty years". The text is copiously illustrated by photomicrographs for which Dr. Helenor Campbell Wilder is responsible, and which maintain a remarkably high standard. One can only admire the vision which inspired the undertaking, and the skill and enthusiasm which carried it through.

The corner-stone of this magnificent edifice is the Register of Ophthalmic Pathology in the American Army Medical Museum. Attempts to establish similar collections in this country have made little headway. Here the ophthalmic surgeon realizes that pathology is not written on the finger-post to success. The bland voice of the radio interviewer and the lurid pages of the journals dear to the "weaker sex" beckon much more clearly and insistently to lure him from the company of the masters. He can only bow in envious admiration to a volume which is a masterpiece in its own limited sphere.

Medical Hypnosis: New Hope for Mankind. By Dr. S. J. Van Pelt, Dr. Gordon Ambrose and Dr. George Newbold; 1953. London: Victor Gollancz. 8″ × 5¼″, pp. 190, with two text figures. Price: 13s. 6d.

OLD WINE in a fresh bottle has been corked up and presented under the label of "Medical Hypnosis" by Van Pelt, Ambrose and Newbold. In every sense, however, it is good wine, well matured and needing no bush. Its flavour is pleasant enough, but may not be found acceptable to the average wine-bibber.

In other words, it makes a considerable claim to treat with benefit many of the commoner illnesses of nervous origin by a method which has never greatly appealed to the average medical man. It is often difficult to see why medical hypnosis has for so long remained beyond the pale of ordinary treatment, particularly when, as this book demonstrates, its propositions are so reasonable. Perhaps, indeed, some of them may appear too reasonable; and this may be the chief weakness of the book—if not of the treatment: namely, that migraine, asthma, frigidity, pruritus, child delinquency, stammering and the pains of childbirth can, with other types of illness, all be resolved satisfactorily by a few hypnotic sessions. We do not doubt that in such cases a favourable response has been obtained in the hands of the authors of this book. The thesis which this book presents is sound. In the hands of the right people similar cures may be anticipated. Unfortunately the average medical man is not yet orientated to the successful practice of hypnosis.

The New Way to Better Hearing: Through Hearing Re-education. By Victor L. Brown, M.D., with an Introduction by Robert West, Ph.D.; 1953. London: Faber and Faber, Limited. 9″ × 6″, pp. 264, with 16 illustrations, 13 in colour. Price: 12s. 6d.

THIS book by Dr. Victor L. Brown, of New York, is essentially directed firstly to the person with impaired hearing, secondly to the parents and relatives of such a person, and thirdly to those concerned with the education

and protection of such a person, namely, teachers, social workers and speech therapists. It is pointed out that the patient must, at least initially, be examined and treated by the otologist and that thereafter efforts should be made in the direction of both reeducation of his hearing faculties and also restoration of confidence in his abilities.

In the first part of the book a lucid account is given of the physiology of the auditory mechanism and of the results experienced by the patient of defects in its function, including descriptions of speech as heard by the partially deaf.

The second part gives to the patient instructions in great detail as to how he must learn to listen, pay attention and concentrate on interpretation of the sounds he hears and so reeducate his hearing. An assistant who is with the patient for the greater part of each day of the training period is considered essential. Separate and precise directions are included for the one who in effect plays a very large and a somewhat onerous part in the treatment. Modified programmes for the hearing reeducation of the elderly patient, the severely deafened and the deaf child are also provided.

The author concludes the work with a number of short case histories with some astonishingly good results. The reading of the book by the otologist and audiologist is to be recommended.

Physical and Emotional Aspects of Marriage. By C. L. Anderson, Dr.P.H.; 1953. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical), Limited. 9″ × 6″, pp. 234, with 14 illustrations. Price: £2 2s.

WHILE avoiding the "frightening", the morbid, the pathological—all extremes—C. L. Anderson has written a very useful and thought-provoking book on sex adjustment in America. The author insists that society must supply clear understanding of the demands and needs of young people caught in the maelstrom of reproduction in life. He asserts that few people reach anything approaching 100% of their potentialities to achieve complete integration and lasting satisfaction in the age group 17 to 22. Too much is left to chance by society as a whole.

The author discusses in detail the various hypotheses about the application to the individual of the sex and reproductive life of human beings. Biology teaches us that the sexual apparatus of men and women is essentially reproductive, but that sex activity which comprehends erotic pleasure alone is mutilated sex activity. The author discusses the hypotheses which become apparent to the sexually mature man and woman and suggests possible reactions pointing out the ultimate results very frankly.

Free and complete discussion is given under the heading "Sex Education" and representative answers are given to the stock questions of children and advice as to the suitable instructor or instructress. The role of the school is also dealt with. This book should prove suitable for the use of parents and school teachers as well as study circle leaders.

The Principles of Neurological Surgery. By Loyal Davis, M.S., M.D., Ph.D., D.Sc. (Hon.); Fourth Edition; 1953. Philadelphia: Lea and Febiger. Sydney: Angus and Robertson, Limited. 9½″ × 6½″, pp. 544, with 359 illustrations, four in colour. Price: 91s. 6d.

THIS is the fourth edition of a book which the author explained originally was intended to make known to physicians and students what can be accomplished in the field of neurological surgery. In order to do this the author has most skilfully put first things first and has most happily avoided the futility so commonly practised of describing in detail and with pretty pictures the technical steps of operations which only years of trial and experience can bring to proper knowledge. The one exception to this is to be found in a somewhat full technical description of intracranial section of the trigeminal nerve. The author explains that he has done so in order to dispel the widely held misconceptions about the risks and difficulties of this most excellent operation. It is strange to hear that such extraordinary misconceptions exist elsewhere than in this country.

The fourth edition is greatly enriched in many respects. The chapter on diagnosis is enlarged by excellent illustrations of the technique of neurological examination. The field of neurological surgery has extended, and there are new chapters on surgical treatment of the psychoses, and of abnormal involuntary movements.

The surgery of intracranial aneurysm and arterio-venous malformations has come to attract the attention and enterprise of the surgeon, and a chapter is devoted to this field. It is interesting to note that the author is not inclined to direct attack on intracranial aneurysm.

This book is beautifully written and most expressive of the science and philosophy of this branch of surgery. The publisher has done justice to the matter. It should find a place on the shelf of any doctor who wishes to know just what can and cannot be done by those who practise this now well demarcated and maturely established branch of surgery.

Diseases of the Throat, Nose and Ear. Edited by F. W. Watkyn-Thomas; 1953. London: H. K. Lewis and Company, Limited. 10″ × 7″, pp. 892, with 367 illustrations, 22 plates in colour. Price: £5 10s.

THIS book is the work of eleven authors. Its "meat" is undoubtedly the aural section mainly by Watkyn-Thomas himself. This portion is well written, up to date and tightly packed with information presented in a readable manner. The author continues his previous practice of avoiding being stereotyped and subjects of particular interest are discussed fully in such chapters as "Hearing Aids", "Management of Chronic Deafness", "Otosclerosis" and "Facial Palsy" *et cetera*. The aural section alone makes the book very well worth reading by all aurists. Many of the other authors are handicapped because of the relative lack of modern progress of their subjects compared with that of otology. As is to be expected in any book with numerous authors, the standard must vary. In this case parts appear to be padded to make chapters out of small subjects and some are separated by unnecessary space. In spite of this criticism there are excellent articles. H. A. Burt, writing on physiotherapy, includes Cooksey's rehabilitation exercises after labyrinthectomy or fenestration. H. A. Lucas writes well on allergy, whilst Peter Milling gives a chapter on local anæsthesia which is good reading, though it omits mention of colouring toxic solutions and could be much fuller.

A welcome innovation is the inclusion of articles by plastic and cerebral surgeons. As would be expected, D. N. Matthews's contribution is first class. He includes details of plain suture of wounds, practical points in the use of the dermatome *et cetera*, which although useful to oto-rhino-laryngologists are not usually given in such text-books. Because Matthews holds the view that major plastic nasal or aural procedures should be carried out by oto-rhino-laryngological and plastic surgeons working together, he omits descriptions of operations on hump nose, rhinoplastic reconstruction, nasal cartilage implants, outstanding ears *et cetera*. This is a pity because even when an ear, nose and throat surgeon leaves such work to those with unusual experience it should be remembered that the work of specialist surgeons of today becomes the routine work of more general surgeons of tomorrow.

The Lambert Rogers contribution on intracranial surgery is limited to abscess. The information he gives on this subject is not that usually found in standard ear, nose and throat works and should prove life-saving.

Some statements in the book will not receive general support, for instance, that sulphathiazole powder should be included in all wounds, that free grafts will not take on bone (the type of bone not being specified), and that the bleeding post-nasal fibroma of puberty never becomes malignant.

A few colour illustrations, particularly some of the larynx, are anæmic and detract from the standard of an otherwise excellent and well got up volume.

Atlas of Medical Mycology. By Emma Sadler Moss, B.S., B.M., M.D., and Albert Louis McQuown, B.S., B.M., M.D.; 1953. Baltimore: Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 10″ × 7″, pp. 254, with 248 illustrations. Price: 86s.

THE advances made during the last fifty years by bacteriology, including the study of the pathogenic viruses, have overshadowed medical mycology. With the discovery of penicillin the tables were turned somewhat, and now we have to consider the effects of antibiotics, which, in controlling the growth of bacteria, may facilitate that of moulds. Probably every hospital laboratory in Australia is being called on from time to time to report on members of these lower fungi, supposed to be playing a pathogenic or subpathogenic role. For those who are not professed mycologists, identification may be difficult and consequently we welcome the admirable illustrations in Moss and McQuown's "Atlas of Medical Mycology". The recognition recently in Queensland of cases of chromoblastomycosis (32 cases), histoplasmosis (one case), and sporotrichosis (one case and

another in Sydney) show how necessary it is in Australia to be aware of their occurrence and to be able to detect the responsible organisms when present. Cryptococcal invasion of the meninges and brain has been found on several occasions in southern Australia and even a huge myxomatous-looking mass in the iliac fossa due to a *Cryptococcus*. In these Australian cases, the large gelatinous "capsules" round the thick-walled organisms have prevented any cellular reaction to the invasion so that no giant cells are found, and the invasion of the brain along the infoldings of the *pia mater* has given rise to the apt description of "white-anting of the brain" from the spaces formed by the mucinous envelopes. Large compacted balls of fungal hyphæ have been met with in cavities in the lung, and even small sclerotia-like minute button mushrooms growing from the wall of a space in the lung. How can the pathologist or bacteriologist, unexpectedly called upon to be a mycologist as well, make the correct diagnosis? First he must know the possibilities, and then the pitfalls. What lesions may have a fungous origin? What do they look like? How may the organisms be detected and cultivated? What are their sizes, shapes and colours in the tissues and in cultures? This atlas may be a boon to him. It contains 248 excellent photographic illustrations of pathogenic fungi and the lesions they produce and of contaminants that may be mistaken for them. The sections deal with actinomycosis, nocardiosis, *mycetoma pedis*, *trichomycosis axillaris*, erythrasma, cryptococcosis, moniliasis, North and South American blastomycoses, histoplasmosis, sporotrichosis, coccidioidomycosis, occasional pathogenic fungi, chromomycesis, dermatomycoses (the ringworms), rhinosporidiosis, *tinea versicolor* and *piedra*. Then follow chapters on methods of examination, cultivation and identification, on the interesting immunology of fungous infections, on contaminants and on culture media, and finally there are a glossary and formulary. As this is an atlas, the illustrations are, of course, the main feature of the work, but they are well supported by the accompanying text. Most laboratories will find this a welcome addition on their shelves, and it should be available in medical and hospital libraries for consultation when examples of fungous infections are encountered.

The Hygiene of Marriage. By Isabel Emslie Hutton, C.B.E., M.D.; Ninth Edition; 1953. London: William Heinemann (Medical Books), Limited. 7¼" × 5", pp. 176, with six illustrations. Price: 12s. 6d.

DR. HUTTON writes an excellent little manual for the instruction of married people, because she is impressed by the amount of unhappiness, anxiety and ill-health that are likely to fall upon people who are not acquainted with facts, which ought to be known to them, before marriage. Dr. Hutton remarks that much of her book should constitute part of the advice given by parents to their sons and daughters. She points out the difficulty encountered by the parent, who conscientiously tries to fulfil this duty, and the incomprehensible outcome to the novice, which so often results, because older people forget the experiences of their own youth. She claims that this is not a medical text-book, but contains much that has been learnt from individual cases and general medical experience.

The author's aim is clearly stated in the preface to the ninth edition—to promote enduring and harmonious marriages. An important factor in the present rate of marriage disharmony is, she thinks, "the lack of religious belief". She lays it down that the greatest part of marital discord is due to lack of education in marriage technique and hygiene.

The book covers the whole field of reproductive life and the period involved in the menopause and climacteric receives special attention. Childlessness is dealt with fully and the author outlines the various aspects of artificial insemination. Ovulation is explained and precise direction given for its timing and, conversely, contraception is adequately dealt with.

Clinical Approach to Fevers. By C. J. McSweeney, M.D., F.R.C.P.I., D.P.H.; 1953. London: J. and A. Churchill, Limited. 7½" × 5", pp. 152. Price: 10s. 6d.

IT is stated in the preface of this book that it represents the course of lectures given by the author to post-graduates in Dublin. As would be expected, all the specific and non-specific fevers are discussed in a most practical manner, most emphasis being placed on their accurate diagnosis and then the subsequent treatment, which is dealt with under the headings of specific and non-specific methods. The author lays due stress on the small details which enable a careful differentiation to be made between the various exanthems, which at times can be so confusing. Throughout, the book is written in an easily read style and, being essentially clinical in nature, it will prove useful to all doctors who need such a work, especially those who do not have a consultant on hand.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"The Radiology of Bones and Joints: An Introduction to the Study of Tumours and Other Diseases of Bone", by James F. Brailsford, M.D., Ph.D., F.R.C.P., F.I.C.S. (Hon.); Fifth Edition; 1953. London: J. and A. Churchill, Limited. 10" × 7½", pp. 890, with 600 illustrations. Price: 90s.

Completely revised since the last edition was issued in 1948.

"First Aid for Industrial Eye Injuries", prepared by arrangement with the Commonwealth Department of Health, in collaboration with the Visual Hygiene Committee of the Ophthalmological Society of Australia (British Medical Association); 1953. Melbourne: Department of Labour and National Service. 8½" × 5½", pp. 20, with three text figures. Price: 1s. 3d.

Prepared to provide authoritative information for management in industry, industrial nurses and first-aid workers.

"History of the Second World War: United Kingdom Medical Series", Editor-in-Chief, Arthur S. MacNalty, K.C.B., M.D., F.R.C.P., F.R.C.S. "Medical Research", edited by F. H. K. Green, C.B.E., M.D., F.R.C.P., and Gordon Covell, C.I.E., M.D., D.T.M. & H., D.P.H., I.M.S. (Ret.); 1953. London: Her Majesty's Stationery Office. 10" × 6½", pp. 404. Price: 40s.

Describes the researches in medical science promoted by the Medical Research Council and by various government departments between 1939 and 1945.

"CIBA Foundation Colloquia on Endocrinology", edited by G. E. W. Wolstenholme, O.B.E., M.A., M.B., B.Ch., assisted by Jessie S. Freeman, M.B., B.S., D.P.H.; 1953. Volume VI. Hormonal Factors in Carbohydrate Metabolism. London: J. and A. Churchill, Limited. 8" × 5½", pp. 364, with 78 illustrations. Price: 35s.

The report of a conference with a distinguished membership.

"The Medical Clinics of North America"; 1953. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical), Limited. Nationwide Number. 9" × 6", pp. 338, with 34 illustrations. Price: £7 5s. per year in cloth binding, and £6 per year in paper binding.

Contains 20 articles on bedside management. Subjects include cardiac emergencies and decompensation, hypertension, asthma, bronchiectasis, pneumonia, toxic goitre, amenorrhœa, diabetes, thrombophlebitis and phlebothrombosis, acute burns, glomerulonephritis, liver disease, ulcerative colitis, common skin disorders, anæmia, backache, acute rheumatism, rheumatoid arthritis and headache.

"Differential Diagnosis of Common Diseases of the Eye-ground", by Paul Tower, M.D.; 1953. New York: Grune and Stratton. 10" × 7", pp. 254, with 129 illustrations. Price: $10.00.

Intended to interest not only the student and specialist in ophthalmology, but also the general practitioner, physician, neurologist, surgeon, urologist and others.

"An Introduction to Functional Histology", by Geoffrey H. Bourne, D.Sc., D.Phil.; 1953. London: J. and A. Churchill, Limited. 9½" × 7", pp. 206, with 98 illustrations. Price: 21s.

Intended to supplement existing text-books.

"Peptic Ulcer: Pain Patterns, Diagnosis and Medical Treatment", by Lucian A. Smith, A.B., M.D., M.S. in Medicine, F.A.C.P., and Andrew B. Rivers, M.A., M.D., M.S. in Medicine, F.A.C.P., with a foreword by George B. Eusterman; 1953. New York: Appleton-Century-Crofts, Incorporated. 10" × 7", pp. 596, with 208 illustrations.

Divided into 21 sections or chapters containing what were stated by Eusterman to be "noteworthy clinical observations". The book is well documented and illustrated.

The Medical Journal of Australia

SATURDAY, NOVEMBER 14, 1953.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: surname of author, initials of author, year, full title of article, name of journal without abbreviation, volume, number of first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance

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DIAGNOSIS IN RETROSPECT.

ANY attempt to make a diagnosis of a diseased condition at a distance of time or place is contrary to the tradition and usage of the medical profession. The patient must be present in person and be subjected to the approved and most recently developed procedures of examination. If the report of a specialist is considered, that specialist must be a contemporary and one in whom the medical diagnostician has full trust. When the problem is to identify and label a pathological condition in a preceding period of time, the great difficulty presents itself that the methods of examination were relatively primitive and incomplete judged by modern standards, and that the ætiology of disease was very faulty. We now regard with pity the efforts of Sir Francis Drake's surgeons to find from post-mortem dissection the cause of death in tropical fever. Perhaps a future generation will look with similar emotion on our wayward guesses at the origin of cancer. Only very rarely do we find in history and biography a clear and unmistakable picture of a disease which we can now name with some assurance. Sydenham helped greatly by grouping diseases into separate species, as Linnæus did plants, but he had no stethoscope, clinical thermometer, ophthalmoscope, biochemical technique or recording galvanometer. The wonder is that he did so well with the inadequate means at his disposal. Take defects of vision as an example of difficulties in retrospective diagnosis. We may rule out Nero, whose eyes were "bluish and weak", and Dante, who complained of his faulty eyesight, as hopeless subjects for diagnosis, for the information proffered is too scanty. What was the nature of Milton's blindness? Some say glaucoma, but others are dubious. What was the eye trouble which robbed us of thirty years of Pepys's diary and at a most important phase of his work? We can only guess. How did Nelson lose the sight of one eye after a blast of pebbles and sand hit his face at Calvi? James Kemble in his "Idols and Invalids" suggests detachment of the retina, but this is conjectural though probable.

The historian cannot avoid taking epidemic diseases into consideration on account of the social, military and economic consequences of the heavy death rate, but he is forced to be content with a general description of the effects of the pestilence and not its precise nature; should he make an attempt at diagnosis or ætiology, mistakes, often ludicrous, are inevitable. A famous example of this is Gibbon's handling of the plague which swept over the Roman Empire in the reign of Justinian in the sixth century of our era. It may be said of this pandemic that it is the one instance in history, before the nineteenth century, of a diagnosis being fairly certain, for all the descriptions which have come down to us indicate bubonic plague. Gibbon, generally accurate and restrained, writes of it: "In a damp, hot, stagnating air this African fever is generated from the putrefaction of animal substance and especially from the swarms of locusts, not less destructive to mankind in their death than in their lives." The epidemic which assailed Athens and which was described by Thucydides, and the even greater pestilence which harassed the Roman Empire under Marcus Aurelius, do not suggest bubonic plague, but what were they? Smallpox say some, but this is pure guesswork. The "black death" which had such profound influence on the labour market in the fourteenth century may have been in part bubonic plague, but certainty is impossible. If we assume that leprosy was rampant in biblical times and also in the Middle Ages, we must admit the sad possibility that often innocent skin complaints were confused with this dread malady and that the victim was compelled to forsake his home and live as an outlawed and unclean thing.

Military enterprises have again and again been rendered futile by disease. The sacred books of the Hebrew religion tell of the destruction of Sennacherib, but unemotional medical science demands a simple explanation and malaria is here to be regarded as a possible cause. Hallam in his history of the Middle Ages speaks of the army of an oppressive dictator being compelled "to moulder in the unwholesome marshes of Rome" and again we think of malaria. Cromwell's army in Ireland and later in Scotland suffered heavily from disease and all sorts of diagnoses have been advanced from syphilis to yaws. The British Walcheren expedition against the France of Napoleon was defeated largely by disease, and again we are unable to state with certainty what that disease was.

Despite his reluctance to give an opinion without the patient being before him, the medical man with leanings towards biography has found pleasure in analysing the illnesses of illustrious men in history. The French have been especially active in this field and one thinks of the many works of Cabanès. Charles MacLaurin, of Sydney, has an honourable place in this gallery; indeed it may be said that his suggested diagnoses are models of restraint as well as scholarship. The temptation in this form of inquiry has been to let conjectures run untrammelled; thus James Kemble in his book already mentioned attributes to Nelson malaria, typhoid, *angina pectoris*, dyspepsia and gout—a goodly list! Alexander the Great, Julius Cæsar, Mohammed and Napoleon have at different times and by different people been described as suffering from epilepsy, but without any foundation of truth.

Napoleon, who must have been a healthy man to have carried out his amazing exploits, has been presented to us as the victim of Mediterranean fever, pituitary insufficiency, vesical calculus and cancer. His final illness may in conclusion enlist our attention.

It has been the custom for many years to diagnose this illness as cancer of the stomach and to draw attention to a possible hereditary factor in that his father was supposed to have died of gastric cancer in the prime of life. This confident assumption of cancer can be found in special studies of recent date, such as those of Chaplin and Sokoloff. Actually the clinical picture is adverse to such a diagnosis. Professor Tauno Kalima, of Helsingfors, was the first or one of the first to state definitely that cancer must be ruled out. This problem has been examined with special care by Sir Hugh Devine in his book "The Surgery of the Alimentary Tract", and one may now feel certain that the great captain died of "a perforating pre-pyloric gastric ulcer from which spread a secondary diffuse gastritis". A vivid description of the last days of Napoleon has been presented to us in the memoirs of Marshal Bertrand (English translation, 1953). Marshal Bertrand was evidently not thinking of publishing his reminiscences, for his diary was written in a home-made shorthand, which has been unravelled with considerable difficulty. The story is a painful one and one must sorrowfully admit that the medical profession does not come out of it with credit. Instead of sedatives, which might have relieved the gastric pain, the unfortunate patient was dosed with calomel and antimony and had blisters applied to his abdominal wall. The vomiting, hiccup and black stools are described with sad attention to detail. One reads of the unshaven cheeks and the unpleasant smell which arose from the body soon after death. The picture presented is perhaps necessary, as all truth is necessary, but the broken man here pictured was not the Napoleon of Lodi and Austerlitz.

Current Comment.

THE DOCTOR IN COURT.

DESPITE many superficial differences, the medical and legal professions have a great deal basically in common. Ultimately, both are concerned with the truth in its relation to practical affairs, and both have to deal primarily with people as people. The more intimate sides of human life come under their scrutiny, often in a privileged way, and they are constantly presented with an inescapable challenge to their intellectual and moral integrity, their capacity to balance honesty to the truth with common sense, and their ability to understand their fellow men. Admittedly, the practising doctor, particularly the private practitioner, sometimes feels that the traditional law court procedures are irksome and unnecessary, but a vast experience lies behind them. As John Bostock and Athol H. Robertson[1] wrote in this journal some years ago, "if he is wise, he will regard the law as remarkably efficient social machinery for the preservation of our rights and freedoms". When he goes to court, he shares with his legal colleagues the responsibility of seeing that that efficient machinery achieves what it is designed for. On this point, the words of Viscount Simon[2] are apposite: "We must remember that practitioners of the art of medicine and practitioners who are engaged in applying the law are working in very different fields. But fundamentally the object at which they are aiming is the same, and the rules which they ought to observe in pursuing that object are alike. We are both serving the community. The doctor in the witness box is applying his special knowledge in the interests of justice." The doctor who is called upon to give evidence in court, and is conscientious about it, will find much to help him in the thoughtful lecture by Vicount Simon from which this quotation is drawn, and in the paper by Bostock and Robertson already referred to. Alongside these papers we would like to place that of His Honour Judge Conybeare which appears in this issue. Judge Conybeare modestly describes many of his observations as "trite and self-evident", but the medical man who is inexperienced in such matters, and probably many who are experienced, will find sound and friendly guidance in what he has to say. The position of an "expert" witness, which the doctor giving evidence as a doctor usually has to assume, is a peculiar one. The medical man who wishes to give a good account of himself will do well to heed the advice of people such as Judge Conybeare and Viscount Simon. If he is foolish enough to ignore them, he has only himself to blame if the consequences are humiliating and unsatisfactory. If his role is to give evidence on a limited and highly specialized field of medicine, he will benefit by the advice of an anatomist, I. Maclaren Thompson.[3] The anatomist is an expert only in anatomy (*sensu lato*), as Thompson points out, and so it must be for each specialist. Thompson's detailed discussion of this from the anatomist's point of view need not detain us at the moment, although it is well worth reading. However, we may refer to his comments on the report commonly submitted by an anatomist, which forms the basis of his evidence. This report, he states, should contain clear statements on (i) the anatomist's opinions, (ii) the facts on which they are based, and (iii) the degree of confidence (or of doubt) with which he holds them. No matter how vague and uncertain his opinion may be, Thompson considers that the anatomist's statement of it should always be clear, so that the reader will understand what the anatomist really thinks on the important point, including his doubts. On the witness stand, however, the anatomist might remember that he is there to help the court to reach a verdict, and that his opinions are more likely to be helpful than are his doubts. Thompson's concluding remark bears a good deal of thought, not only by the "expert" witness, but also by the member of the legal profession who has to deal with that witness in court and may sometimes find him difficult: "Often, however, it is no easy task to formulate opinions that he can conscientiously give under oath. He is apt to recall the whimsical warning of Thomas Henry Huxley, that it is not given to any man to be altogether right, a reflection which it is very desirable for any man to bear in mind who has had the good luck to be nearly right once."

[1] M. J. AUSTRALIA, November 17, 1951.
[2] *Brit. M. J.*, July 4, 1953.

MEPACRINE IN VENTRICULAR TACHYCARDIA.

MEPACRINE, more familiarly known in Australia as "Atebrin", and in the United States as quinacrine or "Atabrine", has been used therapeutically in diseases other than malaria. The demonstration that it possessed the same property as quinine of partially paralysing the vagal inhibitory fibres of the dog's heart suggested that it might be of value in the treatment of certain cardiac irregularities. This suggestion was all the more promising by reason of the well-known powers of quinidine in reestablishing sinus rhythm in arrhythmias such as auricular fibrillation. A. M. Samia and M. M. Alimurung have recently published particulars of the successful use of mepacrine (in the proprietary form "Atabrine") in a case of ventricular tachycardia.[1] They admit that the results in a single case have a limited validity, but they think that their success is encouraging, and that the therapeutic use of this drug may not be limited to supraventricular arrhythmias. They quote the experiences of other workers

[1] *Canad. M. A. J.*, April, 1953.
[2] *Circulation*, August, 1953.

in this field, and point out that most of the successes have been with other forms of arrhythmia. Samia and Alimurung's case was that of a sixty-year-old man who had a sudden attack of precordial pain. He rapidly became seriously ill, and his rapid feeble pulse was found to be due to ventricular tachycardia with a heart rate of 200 per minute. Procaine amide ("Pronestyl") was given with adequate precautions over a period of two days, and on the third day quinidine was substituted and given for three days, but no abatement of the heart rate was observed. After five doses of 0·3 gramme of "Atabrine" every two hours the pulse rate fell to 92 per minute, and the electrocardiogram showed a sinus rhythm with only occasional ectopic beats, but also with the changes characteristic of anterior myocardial infarction. No further evidence of ventricular tachycardia occurred, and the patient made a satisfactory recovery. The only toxic action of the drug was nausea and vomiting. The authors do not claim that mepacrine ("Atabrine") is superior to procaine or quinidine for the resolution of a serious type of arrhythmia like this, but they remark that in spite of the opinion expressed by others that mepacrine should perhaps be used only for supraventricular forms of cardiac irregularity, their experience in this case has shown that the drug may be used for the ventricular type also. At least it seems to indicate that when other drugs such as quinidine and procaine fail to exert the desired effect, there is still an alternative in mepacrine. Samia and Alimurung point out that their experience with this patient illustrates the value of electrocardiographic control in treatment; in this instance it was only after the obscuring ventricular tachycardia was removed that the graphic evidence of infarction was revealed. This is true, but it is perhaps not unfair to observe that the case history was surely that of mycocardial infarction from the beginning, and the treatment of the patient could be controlled, perhaps not ideally, but nevertheless satisfactorily, on clinical evidence. It might be useful to remember possible advantages in the pharmacological nature of this still familiar antimalarial drug.

HEAT HUMIDITY AND CARDIAC FAILURE.

A FREQUENTLY recurring news item in the Press is a report of the collapse or death of elderly persons during a heat wave. Usually there is an impression that the collapse is in itself a manifestation of the direct effect of heat. Experience has shown that, whereas healthy young persons may suffer from heat hyperpyrexia, there are usually other factors. One of the most important of these is dehydration associated with lack of sodium chloride. K. G. Hearne,[1] by personal observation in Mesopotamia during the first World War, noted that a danger sign of importance was the cessation of sweating. From these familiar data it is of interest to compare the circulatory failure of the vigorous and robust with that of the aging person who has an inefficient circulatory system. From such a comparison there emerges a practical consideration in the care of patients with cardiac failure—how they should be managed in a hot humid environment. G. E. Burch contributes an editorial article on this topic in a recent journal.[2] He remarks that it has been noted that a hot humid environment may precipitate acute congestive failure in a patient who is sufficiently compensated to remain at rest in bed without sign of present failure. He further states that patients taken from the ward for the purposes of further investigation may have some degree of failure precipitated more readily if they are exposed to heat and humidity during cool weather than if the external conditions are those of summer, presumably owing to lack of acclimatization. The cases of collapse reported during heat waves are also found to be greater in number in the usually cool zones than in warmer localities because of this factor of acclimatization. The malign physiological factor at work in precipitating circulatory failure is an increase in cardiac output, with the resultant placing of a strain on the tenuously balanced mechanism. Undue heat and atmospheric moisture stimulate the vascular system in an attempt to maintain heat equilibrium, but in persons with unstable circulatory regulation this attempt may be fruitless; heat is then not lost in sufficient amount, and may even be gained. Burch points out that the simple normal reaction of the healthy person to humid heat consists of an increase in the heart rate, dilatation of the skin capillaries, constriction of the visceral blood vessels and an increase in the rate of blood flow, with lessened circulation time, a rise in the cardiac output and a rise in the pulse pressure. All these mechanisms centre round that large organ, the skin, which is perhaps not so much stimulated to work as it might be in a mechanical world.

Moist heat, especially if it is undue, and if the physiological machine is not competent or prepared to meet it, may so upset the elaborate workings of the body with a faulty circulation that failure is the result. Burch warns us that even in a healthy man the increase in the cardiac output may be 100% under conditions of extreme humid heat, but he remarks that few studies have been made, and the relation of cardiac failure to heat has been neglected. Therefore we have no exact knowledge of the ideal temperature level for the cardiac patient. We cannot but be impressed, however, with the comfort and improvement brought about by placing such a patient, who is on the verge of failure or is even suffering from a declared degree of failure, in an air-conditioned room. A similarly gratifying improvement may be seen in the patient threatening a thyroid crisis during very hot weather. Though exact measurement is not possible, there are two reasonably reliable indicators—the expressed comfort of the patient himself and his evident clinical amelioration. With this in mind, even though we have no air-conditioned ward or room, such as was provided at least in one hospital in New Guinea during the second World War, we can refrain from that unsound measure so unsuitable for heat-wave weather, placing the patient in a warm bed. Burch believes that the value of oxygen therapy for such patients in hot weather is chiefly thermal. In a warm bed the skeletal muscular system may be at rest, but the circulatory system is not. Inaction is another friend of the cardiac patient in hot weather, and ill-advised or sudden efforts may precipitate ventricular failure.

One last admonition concerns the blood flow to the various organs. Shifting the blood to the skin just to lose heat is apt to be costly. The brain and the kidneys need full blood supplies, as well as the cardio-vascular system, and three-fifths of the blood passes through the kidneys, the brain and the liver; but under conditions of extreme moist heat these reactions are no doubt reduced with consequent anoxia. Most of Australia experiences considerable degrees of heat during summer months, and the ordeal of sudden bouts of severe heat and humidity demand prophylactic care. Then the patient with threatened or actual cardiac failure, the sufferers from dehydration of chemical, mechanical or thermal origin, and that sensitive plant, the premature baby, demand from us cool and comfort.

A VACCINE FOR POLIOMYELITIS.

"SINCE there is an impression that a practicable vaccine for poliomyelitis is either at hand or immediately round the corner, it may be best to start this discussion with the statement that such a vaccine is not now at hand and that one can only guess what is around the corner." That is the frank and sober way in which Albert B. Sabin opens a recent discussion on this subject.[1] Enormous progress has been made in the last five years. First came the knowledge that the 200 or more strains of poliomyelitis virus that have been recovered fall into three major immunological groups: type 1 (Brunhilde-like), which causes most major epidemics; type 2 (Lansing-like), which causes chiefly sporadic disease, but whose antibodies are found in most adults the world over; type 3 (Leon-

[1] M. J. AUSTRALIA, February 13, 1932.
[2] *Arch. Int. Med.*, July, 1953.

[1] *Am. J. Dis. Child.*, September, 1953.

like), which is found only occasionally in epidemics. In general, immunity against one type does not give protection against another, though slight overlapping does occur. Then Enders and his colleagues developed tissue culture techniques that made the cultivation and identification of poliomyelitis virus a relatively cheap and easy procedure, and opened the way for the progress that is being made since. This is probably the biggest step yet toward the goal of a satisfactory vaccine.

Three types of vaccine could be developed. The first is a killed vaccine, made from virus grown in tissue culture and killed usually by formalin. Such a vaccine has been made for all three immunological groups of virus, and a small dose has produced a good rise in antibody titre when injected into a small number of human subjects. However, it is likely that many of these subjects had been infected with poliomyelitis before, and the injections simply acted as boosters. It is not known yet how big a dose would be needed to produce a response in a previously uninfected person. It is not known how long this response would last, nor how great a response would be needed to give protection against infection. It is essential to be sure that the tissue used for culture is easily available, and that the vaccine is free from danger. Such danger could be another virus present in the tissue used for culture and not killed as easily as poliomyelitis virus nor easily detected. The virus of hepatitis is an example of this. Another danger is the survival in the vaccine of small amounts of a strongly paralytic strain of poliomyelitis virus. If animal tissues were used for culture, anaphylactic reactions could occur. These difficulties should not be insuperable. But when a plentiful, potent and safe killed vaccine is made, we will still have to find how long its protection will last. Subclinical infection may give a life-long immunity, but will a killed vaccine do this? Or will it give protection for only a few years, leaving the individual unprotected at an age when, if he contracts the disease, it is more likely to be serious? It is generally agreed that poliomyelitis is likely to produce more extensive paralysis in the adult than in the young child, and it would be a pity if a vaccine prevented mild disease in early childhood only to allow serious illness in young manhood. The second type of immunization could be an injection of active virus along with antibody. If the two are mixed and given together in monkeys, many animals do not develop antibodies. If they are given simultaneously but in different sites, antibodies do develop, but the risk of paralysis is not completely eliminated. The third type of vaccination would be with a live but avirulent virus. It has been shown repeatedly that the virulence of a strain of virus can be reduced by tissue culture passage or animal passage. But so far no completely avirulent strain that could be used for human vaccination has been developed. Moreover, there is no proof that a strain avirulent for one animal species is so for another. What is safe in monkeys may not be in man. It is likely that a living avirulent virus will produce a more lasting immunity than a killed vaccine or one covered with antibody.

Sabin's opening statement is obviously true: "In the field of poliomyelitis it is more correct to say that we have only just begun to learn than . . . that the job is nearly finished." No one can be sure yet which of the above vaccines will be best. A killed vaccine seems less remote than a live avirulent one at present, but will its protection be as reliable or as durable? Enough has been done to make one optimistic that success will be achieved, but it seems plain that much work must still be done and several years pass before the goal is reached.

MILK-ASPIRATION PNEUMONIA.

ASPIRATION PNEUMONIA due to milk is a well-recognized hazard in children, but it is little thought of as occurring in adults. However, autopsy studies of both infant and adult subjects have convinced Thomas J. Morgan that this disease is more common than most clinicians and pathologists realize. Its clinical diagnosis certainly presents difficulties, as does the identification of milk in tissue sections by the pathologist. In addition, according to Morgan, the pathological changes produced by aspiration of milk have not been completely understood. These changes, in his experience, include acute pneumonia, abscess formation, focal and widespread granulomata, alveolar thickening, giant-cell reaction and fibrosis. The reaction is usually mononuclear and granulomatous at the time of death. Giant-cell reaction is not constant and may be entirely absent. Morgan also describes the tissue reaction produced experimentally by intratracheal injection of varying amounts of feeding mixture (evaporated milk, water and "Dextrimaltose"), human milk or cow's milk into rabbit lungs. He states that the tissue reactions evoked by the three types of milk are identical, and the changes produced are the same as those seen in human milk-aspiration pneumonia. However, the immediate reaction to large amounts (10 mils or more) of feeding mixture is entirely different from the reaction to identical amounts of cow's milk or human milk. Relatively small quantities of feeding mixture (10 to 20 mils) often produced death from pulmonary œdema in one to eleven minutes, while similar quantities of cow's milk or human milk rarely caused death. A definite reaction to the milk occurred within a few minutes of the time of injection. Examination of smears and sections of the milk in the bronchi showed numerous red blood cells, granulocytes and macrophages. Occasional macrophages contained fat, apparently from the milk. Examination of tissue sections showed early exudation of red blood cells, granulocytes and macrophages in numbers greatly exceeding those in control animals. Later reactions to injection of milk varied from acute pneumonia to focal and widespread granulomatous lesions with giant-cell reaction and fibrosis. Alveolar thickening was a prominent feature of the reaction. Emphysema was seen in connexion with focal atelectasis or small or large granulomata.

Morgan states that although some features of the disease both in human and in animal lungs resembled certain features of lipid pneumonia caused by liquid petrolatum or cod liver oil, the general reaction more closely resembled that seen in response to injection of solid foods. He is of the opinion that because the response is to the milk protein as well as to the fat, the term milk-aspiration pneumonia more accurately describes this disease than terms such as lipid pneumonia caused by milk. Difficulties in recognition of this disease both in animal and in human subjects are stressed. Microscopic studies of the human and animal material suggest that many instances of mononuclear pneumonia occurring in infants may be caused by aspiration of milk. Knowledge of the microscopic appearance of milk in routine sections and understanding of the pathological changes produced by milk in human and animal lungs should lead to more frequent recognition of this disease in human subjects, especially in infants and in old people. This in turn should emphasize the need of continuous instruction of nursing personnel on feeding methods and general nursing care designed to eliminate the hazards of aspiration pneumonia of any type.

WHAT HAPPENS TO ALCOHOLICS?

THE psychiatrist treats many alcoholics at some stage of their career, but more often than not he does not know what becomes of them ultimately. Many questions must remain unanswered in his mind. In an attempt to answer some of these questions Frederick Lemere[1] collected and analysed the life histories of 500 deceased alcoholics, as they were supplied to him by their immediate relatives of a subsequent generation; these relatives were Lemere's own patients. The source naturally sets a limit to the accuracy of the histories; and as the investigation was concerned with previous generations, its results do not reflect the influence of modern treatment or, indeed, of

[1] *Am. J. Psychiat.*, March, 1953.

much treatment at all. However, with these limitations, the findings are of considerable interest. The investigation covered 500 alcoholics. In 28% of cases the drinking became worse until the subjects died directly or indirectly from the effects of alcohol. In 10% the drinking was moderated and ceased to be a serious problem—an encouraging finding for the addict who really wishes to become normal. In 29% the drinking continued essentially the same throughout life. In 22% drinking was stopped at a "terminal" illness which threatened life or resulted in invalidism. In 11% drinking was stopped permanently and without a terminal illness; in most cases this was after the age of forty-five years. Further analysis of this last group (53 of the total of 500) shows that 36 (7% of the total group) stopped drinking on their own without known outside assistance, 13 (2·6% of the total group) did so as the result of a religious experience, and four did so as a result of medical treatment. Another aspect of the investigation covered complications of alcoholism. Of the 500 subjects, 11% committed suicide, 6% died in a psychotic state, 19% were divorced one or more times, and 5% became derelicts, dying in that state. The average length of life in the whole group was fifty-two years; 16% lived to an age of seventy-five years or more, and 12% died at the age of forty years or less. In 8% of cases the subject stopped drinking for three years or longer, only to relapse at a later date—a finding which shows the importance of prolonged follow-up studies.

It is difficult to assess the value of these figures; they are second-hand and, coming from relatives, probably reflect bias in a number of ways. Just the same, some of the broader implications can probably be accepted. It is interesting to note that, according to a speaker in the discussion that followed presentation of Lemere's paper before the American Psychiatric Association, the efficacy of psychotherapy is quoted as 10% or at most 15% in the Social Work Yearbook for 1949. These figures are not very much greater than the 7% of Lemere's 500 people who were stated to have stopped drinking of their own accord; either this figure is greatly exaggerated or much of the time, effort and money expended on psychotherapy is wasted. On this question and many others, Lemere's investigation provides a stimulus to further studies rather than the answer to the unknown.

DIETARY NOMENCLATURE.

DIETARY MEASURES in the treatment of disease can be effective only if the name of the diet requested by the physician conveys to the nurse and dietitian just what is needed. There is a great deal of looseness in the naming of diets, and Corinne Robinson[1] appeals for more exact specifications for diets. Inexact terms, such as "high" and "low", in describing diets are common. For example, when a "high protein" diet is ordered it is customary in most hospitals to provide approximately 100 to 150 grammes of protein daily. This is high when referred to the 70 grammes allowance for a man in health and may be a liberal amount for many ill persons. It would be the normal or expected protein intake for pregnant and lactating women, or it might be too low in certain diseases and surgical situations. Similarly a "low calorie" diet may be 800, 1200 or 1500 Calories when referred to normal requirements.

Considerable confusion still exists concerning the efficacy of diets restricted in sodium. Diets described as "low sodium", "low salt" and even "salt free" are known to vary from less than 200 milligrammes to more than 1000 milligrammes depending on individual planning. Obviously, comparison of diets at such widely varying levels is unreliable. As most foods contain some sodium, no diet is in a strict sense "salt free". The term "low salt" is also insufficiently exact; for besides the naturally occurring sodium, added sodium products such as baking powder may be present. The interchangeable use of the words "salt" and "sodium" in describing sodium-restricted diets cannot be condoned. The so-called "high vitamin" and "high iron" diets do not in any sense provide therapeutically effective levels of most of the vitamins or of iron, respectively. Then, again, the so-called "low residue" diets are badly defined. There appears to be little discrimination between the use of the words "fibre" and "residue". Some such diets reduce the amount of fibre only, others omit milk, fruit and vegetables.

All too frequently diets are named according to disease conditions—for example, "ulcer diet", "gall-bladder diet" (moderate or low fat diet), "anticonstipation diet" (high fibre diet), "cardiac diet" (soft, 500 milligramme sodium diet). Not only is the psychological connotation of such nomenclature unfortunate, but the use of a disease name suggests that the diet is limited to that condition alone. On the other hand, the use of a person's name for a diet is not desirable; although some, such as the Sippy diet, convey a definite description to all versed in dietary procedure because of long use. In general terms, terminology should be related to the modifications of the normal diet; that is, it should be stated as an increase or decrease in one or more nutrients, change in consistency and so on. It should specify nutrient levels whenever quantitation is essential to the success of the diet. Sodium level should be stated for restricted sodium diets, the calorie level for low calorie diets and so on.

[1] *J. Clin. Nutrition*, March-April, 1953.

INTERNATIONAL CERTIFICATES OF VACCINATION AGAINST SMALLPOX.

INFORMATION has been received that the World Health Organization has introduced a new form of International Certificate of Vaccination against Smallpox. The new certificate is in such a form that it must be issued and signed by the person actually performing the vaccination. It will no longer be possible for medical practitioners to vaccinate intending travellers and then send them to a government clinic for confirmation of the reaction and the issue of an International Certificate. Medical practitioners are advised that International Certificates published by the World Health Organization may be obtained from H. A. Goddard Proprietary, Limited, 255A George Street, Sydney, at a cost of 4d. each *plus* postage of 3d. for one to five copies. Dr. A. J. Metcalfe, Commonwealth Director-General of Health, has agreed that the Commonwealth Department of Health, when requested, will place an official stamp on the completed certificate, certifying that the signature is that of a registered medical practitioner—provided, of course, that the signature can be satisfactorily identified. So as to avoid embarrassment to Australians travelling overseas, medical practitioners who issue these International Certificates are advised: (i) to fill in the certificates completely; (ii) to identify their signature as that of a medical practitioner by adding at least one of their university degrees to the signature; (iii) to send the patient to one of the branches of the Commonwealth Department of Health so that the official stamp may be added; (iv) to confirm the signature on the certificate by a telephone call or covering letter to the Commonwealth Department of Health.

INDEX TO "THE MEDICAL JOURNAL OF AUSTRALIA".

THE index to THE MEDICAL JOURNAL OF AUSTRALIA for the half-year ended June 30, 1953, has been published. Readers who are on the index mailing list will receive their copies as usual. Others who desire to receive a copy should apply to the Manager at The Printing House, Seamer Street, Glebe, New South Wales.

Abstracts from Medical Literature.

RADIOLOGY.

Localized Thinning and Enlargement of the Cranium.

ARTHUR E. CHILDE (*Am. J. Roentgenol.*, July, 1953) states that localized thinning and enlargement of the cranium constitute a very significant radiological finding. Although comparatively rare, such changes are probably more frequent than is generally realized. The commonest site for this process to occur is the middle cranial fossa and its immediate vicinity. Most patients in whom such radiological changes occur are children or young adults. Although various lesions may give rise to localized cranial thinning and enlargement, the most frequent cause in the author's series of cases was chronic subdural hygroma. The lesion probably occurs as a result of trauma which produces a tear in the arachnoid, allowing fluid to escape into the potential subdural space. Here it may accumulate outside the cerebro-spinal fluid circulation and produce compression of the intracranial contents exactly in the same way as a subdural hæmatoma. No communication between the subdural hygromata and the subarachnoid space or ventricular system was found. The radiological findings in cerebral agenesis may be quite similar to those produced by chronic subdural hæmatomata and hygromata, and differentiation between agenesis and subdural fluid may well be difficult without recourse to pneumoencephalography. The scalloped margins which are frequently present in chronic subdural hygromata may be confusing, and if it is not recognized that there is actual enlargement of the cranial cavity, this type of lesion may be misdiagnosed as an epidermoid (cholesteatoma). With developmental thinness of the parietal bones the bone changes tend to be bilateral and the thinning involves the outer table and diploë. There is no increase in the internal volume of the skull or in the configuration of the inner table with this condition. Deficiency of the dura, which sometimes results from head injuries either at birth or later in life, may deform the inner table of the skull and may be associated with some outward bulging and even a cranial defect. Under these circumstances the inner table tends to be irregular with the formation of small pits, and there may also be new bone formation resembling stalactites. The occipital bone above the level of the transverse sinuses, on either side of the mid-line, is often quite thin, and it may even appear to bulge outward slightly. This is rarely significant, and it is unwise to consider such thinning pathological if there is no other visible cranial abnormality.

Water Intoxication: A Hazard of Enemata in Megacolon.

J. L. POTTS (*Clin. Rep. Adelaide Child. Hosp.*, Volume II, Number 4) states that water intoxication is an alarming shock-like condition that may follow a barium enema or colonic lavage in a patient suffering from megacolon. Two cases are reported, both of which followed the administration of a barium enema, although the precipitating factor in one case was undoubtedly a prolonged colonic lavage prior to the enema. It is suggested that when patients with megacolon are to be given enemata or colonic lavages, the solution used either should be an isotonic one or (preferably) should contain seven grammes of gelatin per 100 mils of water. The latter solution would prevent the occurrence of acute pulmonary œdema. The essential disturbance in water intoxication is reported to be a state of low-sodium shock, with cerebral œdema as one of the oustanding features. Treatment of the established state is the early intravenous administration of hypertonic saline.

The Lungs of Miners with Rheumatoid Arthritis.

A. CAPLAN (*Thorax*, March, 1953) describes unusual radiographic appearances of the lungs of miners suffering from rheumatoid arthritis. Of about 14,000 claimants for pneumonokoniosis disablement benefit in Wales, 51 were found to be suffering from rheumatoid arthritis. In 46 of these X-ray films of the chest showed massive fibrosis, whereas fibrosis was massive in only about 30% of the whole number of claimants. In 13 of the 51 cases, the X-ray appearances were of a peculiar type, with many round, well-defined opacities distributed fairly evenly throughout both lung fields, especially at the periphery. The author suggests that these lesions are probably allied to tuberculomata and are a form of tuberculosis modified by dust, and that the joint changes may be a manifestation of "tuberculous rheumatism".

Bronchography with Absorbable Contrast Media.

M. E. PECK *et alii* (*J. Thoracic Surg.*, March, 1953) have compared the advantages and disadvantages of water-soluble absorbable contrast media for bronchography with those of iodized oil. It was found that the iodized oil yielded satisfactory bronchograms much more consistently. In two cases the carbohydrate base of the water-soluble medium, which has a high molecular weight, precipitated fatal anaphylactic reactions. On the other hand, the water-soluble medium gave films of excellent contrast and did not precipitate the bronchospasm sometimes seen with the use of iodized oil.

X-Ray Differentiation of Pulmonary Tension Disorders.

J. A. CAMPBELL AND R. A. SILVER (*Radiology*, August, 1953) discuss the differentiation between solitary congenital cyst, subpleural blebs and tension pneumothorax. They state that all of these produce large, extremely clear areas of rarefaction and may rapidly give rise to alarming respiratory embarrassment. Solitary congenital cysts and tension pneumothorax produce the largest areas of involvement of this type and cause considerable rib separation, diaphragmatic compression and mediastinal displacement. The check-valve mechanism of the cyst causes a huge tension cavity, which greatly distorts the lobe in which it arises. Frequently these cysts will expand to occupy the entire hemithorax, but do not herniate across the anterior mediastinum. When a loculated tension cyst arises in the extreme periphery of the lung, it may cause stretching of the overlying visceral pleura so as to occupy the pleural cavity completely. In such an instance, the surrounding normal lung does not collapse, but is compressed against the mediastinum and becomes invisible. The area of rarefaction produced is extremely clear. An identical situation may arise from a huge solitary subpleural bleb. These forms closely resemble tension pneumothorax. The congenital cyst may be distinguished from tension pneumothorax or an excessively enlarged bleb by the following characteristics. First, there may be discernible areas of lung tissue at the apex or in the angles of the thorax, with absence of collapsed lung at the hilus. The unaffected lung is compressed, but not collapsed as in pneumothorax. In addition, one may see irregular dense lines of several incompletely formed trabeculations stretched obliquely across the illuminated area. Some of these represent the broncho-vascular structures leading to the surrounding lung tissue. Still further distinction may be made by noting the absence, around the collapsed lung, of a clear outline of the pleura, which is visible in most instances of pneumothorax. There is usually a very distinct herniation of the pleural sac across the anterior mediastinum with tension pneumothorax, a feature which is absent or much less striking with congenital cyst. Even when a tension pneumothorax cavity is partitioned into cyst-like compartments by pleural adhesions, one should be able to make out the continuity of the pleural line over the collapsed portions of the lung. In contradistinction, the boundary between the bullous cavity and the adjacent emphysematous lung is difficult to follow as a continuous line. When such a border is visible, it is exceedingly thin and appears irregular at the points where the pulmonary septa project into the air-containing cavity. The differentiation may sometimes be aided by direct needle aspiration of the cystic cavity followed by injection of a small quantity of iodized oil. With tension pnemothorax, the injected oil follows the pleural contours of the collapsed area, whereas with the cyst it will outline the circumscribed limits of this uncollapsed cavity. The post-infectious pneumatocele may be distinguished by the surrounding inflammatory infiltrate and the characteristic changes in its appearance on a sequence of skiagrams. When a pneumatocele is suspected, conservative measures and serial skiagrams are indicated. During the initial consolidative phase of interstitial pneumonia, such a lesion has the appearance of air bubbles deeply seated in the lung parenchyma. During the phase of consolidation, a small, poorly outlined spherical cavity is seen. With resolution of the consolidation, a vivid thin-walled cyst is formed that is first surrounded by a wide margin of lung tissue, but may rapidly enlarge under tension so as to fill the entire lobe. Only at this stage is a problem in differentiation created, but identification may be established in the following ways. The pneumatocele may vary greatly in size from day to day, occasionally ballooning up to alarming proportions. Suddenly it may disappear entirely because of loss of the valvular mechanism in the bronchus, with immediate reexpansion of the surrounding lung. It is usually not accompanied by large areas of lobular atelectasis. Although the pneumatoceles frequently show the appearance

and disappearance of shifting fluid levels, they rarely become converted into true abscesses. It is common in staphylococcal and tuberculous infections for one or more cyst-like areas to disappear while other similar areas of rarefaction develop. This indicates different stages of pneumonic development incident to the bronchogenic spread of these infections. Pneumatoceles occur as single isolated parenchymal cavities in cases of localized bronchial tuberculosis and similar granulomatous infections. In such an instance, there will be no surrounding inflammatory infiltrate, and differentiation from a congenital cyst or bullous cavity will depend upon changing size, presence of fluid levels, clinical findings and absence of the lesion on previous skiagrams. The vast majority of pneumatoceles disappear spontaneously as the infection subsides, although they may persist in the skiagram for several months after disappearance of the inflammatory densities. After collapse or gradual disappearance of the cyst, the walls are impossible to find in the subsequent skiagrams.

PHYSICAL THERAPY.

The Treatment of Prostatic Carcinoma with Radioactive Gold.

H. DABNEY KERR *et alii* (*Am. J. Roentgenol.*, June, 1953) report on the treatment of fifty cases of carcinoma of the prostate by injection of radioactive gold (Au^{198}) with a follow-up of from six to seventeen months. They state that, in all, 129 selected cases have been treated. Cases in which there is extension of tumour beyond the capsule of the gland but no evidence of metastasis outside the pelvis are regarded as best suited for this method of therapy. From 40% to 60% of the total cases belong to the group obviously beyond hope of cure by surgical means but with no demonstrable metastases. In the past, X-ray therapy alone or X-ray therapy with radon seed implantation has been tried with an occasional good result. It was thought that radioactive gold (Au^{198}), whose main radiation component is β rays, might be a suitable isotope to try in a site such as the prostate. A standard suprapubic approach is made to the prostate. All possible operative procedures are carried out before the actual injection or the gold is begun; this is an important factor in the protection of personnel from excessive radiation. The extent of the disease and size of the lesion are estimated, and the total dosage to be used and the number and location of the various injections are decided. The material is injected into the prostate from within the bladder, covering the apex of the prostate, around the urethra and the two lateral lobes. Then the periprostatic region and the seminal vesicles are injected transvesically and extravesically. Any palpable nodes or masses extending from the prostate to the pelvic wall are also injected. The isotope is diluted with a mixture of 100 mils of normal saline, 100 turbidity units of hyaluronidase and one mil of 1:1000 adrenaline. It is suggested that a moderate-sized prostate weighing between 30 and 60 grammes is best treated with a millicurie per gramme ratio of two to one. Usually from 8 to 16 mils of the diluted material are injected into the prostate. At least 98% of the tumours have shown a prompt and rapid decrease in size of the palpable neoplasm. In 11 of the 37 cases, biopsies after injection showed no evidence of neoplasm. Of the 50 patients studied in detail and observed from six to seventeen months, 26 are alive without evidence of clinical disease and seven died without evidence of carcinoma. Complications are confined to rectal irritation; 15 patients in the first 50 and three in the last 67 had this complication. Four developed rectal ulcers, and three of these required colostomy.

The Xanthomatoses.

I. G. WILLIAMS (*J. Fac. Radiol.*, April, 1953) states that it is believed today that Letterer-Siwe's disease, Hand-Schüller-Christian's disease and eosinophilic granuloma are different aspects of the same condition, having a common ætiology in a disturbance of lipoid metabolism. Signs and symptoms depend entirely upon the location of the tumours. Letterer-Siwe's disease occurs in children under four years of age, and is usually fatal within six months. The tumour-like processes affect the liver and spleen, bone marrow, lymph nodes and skin. There are no records in the literature of the use of irradiation in treatment. Hand-Schüller-Christian's disease is classically identified by exophthalmos, defects in the bones of the skull and *diabetes insipidus*. These conditions are due to tumour-like masses replacing bone, extending into the orbit and involving the pituitary region. In addition, any organ in the body may be involved. A common site is the bone marrow of the jaw. Although most common in children, cases have been recorded in adults. Eosinophilic granuloma was first described in 1940, as a benign granuloma of bone, the tissue consisting of reticular cells, eosinophilic cells, histiocytes and giant cells. Later workers noted transitional forms between Letterer-Siwe's disease, Hand-Schüller-Christian's disease and eosinophilic granuloma. Eosinophilic granuloma occurs mainly in late childhood or early adult life. Although the disease may occur in any site, the most important from a radiotherapeutic aspect are the lesions in bone, nervous tissue, soft tissue, lung, liver and spleen. Spontaneous regression may occur, but the lesions are sensitive to irradiation. Bone lesions respond extremely well to irradiation. The usual technique is to give 1000*r* to 1200*r* to the lesion within five or six days. Bony lesions, soft tissue masses and cerebral deposits are treated, but the author does not treat pulmonary, hepatic or splenic lesions. Healing occurs by fibrosis, and in these latter cases it is felt that irradiation may cause further distress.

Carcinoma of the Corpus Uteri.

T. LEUCUTIA (*Am. J. Roentgenol.*, November, 1952) presents a series of 240 patients with carcinoma of the *corpus uteri* treated from 1924 to 1945 by various combinations of intracavitary radium implantation, external X irradiation and hysterectomy. The cases fall into three periods. In the first period, 1924 to 1932, 53 patients were treated by deep X-ray therapy in association with surgery in operable cases, and intracavitary radium implantation in the inoperable cases. Radiation therapy, in general, was given after operation. In the second period, from 1932 to 1936, there were 35 patients, and here deep X-ray therapy and supervoltage X-ray therapy were used in an equal number of cases. The other methods remained the same, except that pre-operative irradiation was given more frequently. The third period began in 1937, with the exclusive use of supervoltage X-ray therapy, and up to the year 1945, 152 patients had been treated. In this period irradiation was given more frequently before operation than after. The patients with inoperable growths continued to be treated by intracavitary radium implantation as an adjunct to external irradiation. In general, three methods were followed: (*a*) pre-operative irradiation *plus* hysterectomy, later followed by irradiation two or three weeks after operation; (*b*) hysterectomy followed by post-operative irradiation; (*c*) irradiation alone. The results were found to improve over the years. The five-year survivals rose from 45% in the first period and 50% in the second period to 60% in the third period. It was also found that the results with supervoltage irradiation were superior to those with deep X-ray therapy, and the most effective method was method (*a*), which gave an 81·2% five-year survival result, as against 47·8% for method (*b*).

MEDICINE.

Nystagmus.

C. WILBUR RUCKER (*Am. J. Ophth.*, February, 1953) defines nystagmus as an involuntary to-and-fro movement of the eyes resulting from a disturbance within a complex apparatus designed to keep the eyes in constant relation to their environment, which is intimately concerned with equilibrium. He classifies nystagmus into five groups: in group I are those varieties produced by defective vision; in group II are those varieties due to stimulation or depression of the labyrinths; in group III are those caused by weakness of the extraocular muscles; in group IV are those caused by disturbance in the central nervous system; in group V are cases of nystagmus due to miscellaneous causes. The author analyses these groups and describes the various types of nystagmus.

The Hyperventilation Syndrome.

B. L. LEWIS (*Ann. Int. Med.*, May, 1953) discusses the hyperventilation syndrome. He states that this condition, characterized by gross hyperpnœa and often tetany, has been considered purely functional. However, it may coincide with organic disease, such as encephalitis, drug encephalopathy or anoxæmia in high flying. The loss of carbon dioxide by deep breathing causes alkalosis. Faintness, giddiness, paræsthesias, tachycardia, blackouts, extrasystoles, flatulence, dry mouth and emotional disturbances may occur. Weakness, fatigue and exhaustion follow. Voluntary over-breathing will produce a typical attack. The condition is not uncommon. Treatment should be directed to any organic cause, and psychotherapy, mainly encouragement and reassurance, is essential.

Special Articles for the Clinician.

(CONTRIBUTED BY REQUEST.)

LXXXVII.

THE DIAGNOSIS OF LEPROSY.

LEPROSY is a chronic infective disease of the reticulo-endothelial system due to invasion by *Mycobacterium lepræ*.

The typical early lesion is a focal infiltration involving the connective tissue and nerves of the corium. The pathological process spreads from the lesion peripherally, and in addition infection may be widely disseminated through the lymphatic system or less frequently by the blood-stream to other parts of the body, there to initiate new lesions.

Once the disease is established, phases of acute exacerbation, attended perhaps by the appearance of new lesions, alternate with periods of indefinite length during which there is spontaneous improvement, marked by temporary regression or even permanent arrest of the pathological process in the affected structures.

The site and extent of infection, differences in the strength and form of tissue response and variation in the degree of progress or regression, all together and severally influence the nature, evolution and residual effects of lesions and determine a wide variety in the clinical picture presented.

HISTOPATHOLOGY.

Entry of the mycobacterium through the intact or abraded skin provokes one or more of the following types of reaction:

1. An effectual defensive response which impairs the efficiency of the adjacent structures but confines the pathogen to the skin and eventually eliminates it. There is œdema and dense round-cell and macrophage infiltration of the corium, particularly involving the nerve fibrils. Later the macrophages assume the character of epithelioid cells and coalesce to form typical giant cells, each surrounded by a dense zone of round cells and predominantly sited round the gland ducts, hair follicles and vessels of the corium. Because the reaction is effectual, *M. lepræ* is difficult to find in stained sections of the lesion. On resolution of the acute reaction, cellular infiltration disappears, but in cases of densest infiltration there remains residual fibrosis of the corium and nerve fibrils.

2. An ineffectual response which fails to control dissemination. At first there is a sparse and diffuse round-cell infiltration, mainly confined to the deeper layers and leaving a conspicuously unaffected zone intervening between the infiltrated area and the corium. The sweat glands, hair follicles and nerve fibrils are unaffected. Macrophages are present from the outset, but whilst they are actively phagocytic they fail to control the invading organisms. Later the macrophages degenerate into large vacuolated cells of foamy appearance—the so-called foam cells—and into the characteristic lepra cells—large ill-defined masses heavily charged with acid-fast bacilli. Acid-fast organisms swarm throughout the lesion, many phagocytosed, but many more lying free in the connective tissue. Ultimately there may be dense infiltration and œdema extending into the corium, but there is never any evidence of giant-cell formation or of any effective limitation to the peripheral spread of the lesion.

3. An indeterminate response, intermediate in character between these. Features of both effectual and ineffectual response are present in variable degree. The corium, its ducts, hair follicles and nerve fibrils are involved in the infiltration, and typical giant-cell formations are to be found. Nevertheless, *M. lepræ* is readily demonstrable, and there is evidence of its peripheral advance. The ultimate fate of the indeterminate type may be conversion to an effectual or lapse into an ineffectual response.

Independently or concurrently with any one or more of these lesions there may be evidence of involvement of major nerve trunks. Those most commonly affected are the ulnar and the common peroneal nerves. Histologically, there is dense cellular infiltration and œdema of the nerve trunk, resulting in complete or partial destruction of the axons by fibrosis or abscess formation.

LESIONS.

Depending upon their position and intensity, these four types of pathological process produce the cutaneous stigmata and impairment of nerve function characterizing clinical leprosy.

Cutaneous Stigmata.

The character of the cutaneous stigmata is determined by the nature of the tissue response evoked.

The Macule and the Lepride.

Effectual and indeterminate responses produce the macule and the lepride, lesions which reveal the effects of infiltration of the corium, its nerves and associated structures—hypopigmentation, hyperæsthesia or (later) anæsthesia, and anhydrosis. Proportionally to the success attending reaction there will be (i) scarcity of mycobacteria; (ii) abrupt demarcation of the margin; and (iii) ultimate resolution and arrest of the pathological process, notwithstanding that damage to special structures may prove irreparable.

The lesions may be solitary or multiple and most commonly appear over the scapula, buttocks and lateral aspects of the limbs.

The macule is a round or oval area of hypopigmentation or discoloration without any induration or other apparent disturbance of the normal skin texture. The margin is abruptly demarcated from, but is not elevated above, the surrounding skin. In the white subject, it may be rose or yellowish-brown in colour, possibly with a darker perimeter. In the dark-skinned subject, hypopigmentation confers a coppery hue. In a proportion in which the upper layers of the corium are involved, cornification may be disturbed, so that the epidemis has a mosaic or ichthyoid appearance.

The lepride is a more advanced lesion of similar distribution, to be differentiated from the macule by its infiltration, which may be apparent only at the clearly delimited margin or may involve the whole area, imparting to it the quality of a clearly defined discoloured plaque of whipcord density superimposed upon the normal skin. When superficial layers of the corium are chiefly involved, the papillæ of the skin may be obliterated, and the lepride presents a smooth, even, glossy surface. When deeper layers are involved, the upward pressure of the infiltration and œdema on the one hand, and the counter-traction of the hair follicles and gland ducts on the other, accentuate the natural folds of the skin, producing an abnormal roughness. The surface of the lesion is insensitive to heat, touch and pain, and in the more prominent lesions the cutaneous nerves supplying the area may be palpable. In the white subject, the lesion is discoloured, yellowish-brown or cyanotic, with a raised erythematous margin. In the dark skin it is coppery in colour. After some weeks or months resolution may take place at the centre, leaving an area of normal skin within an annular lepride. If, however, the cutaneous nerve endings have suffered irreparable damage, this skin, although apparently normal, remains anæsthetic.

Major leprides with heavy infiltration are liable to acute exacerbation and remission. During exacerbation they may break down and ulcerate. On healing after remission the superjacent skin assumes a wrinkled appearance reminiscent of crumpled tissue paper.

The Leproma.

The ineffectual response produces the leproma, the lesion typical of advancing leprosy. Cardinal features of lepromata are diffuse ill-defined infiltration, wide dispersion and absence of nerve and gland involvement. Lepromata may exist unsuspected below the normal skin or as visible cutaneous stigmata.

The latter are more numerous, more widely dispersed and at first somewhat smaller than typical leprides. They appear as reddish-brown or cyanotic areas of soft infiltration with an ill-defined edge merging imperceptibly into the surrounding skin. They extend peripherally, and adjacent lesions tend to coalesce. In many situations local constraint of the infiltration by fibrosis results in the development of nodules varying in size from a pea to a walnut. At first there is no anæsthesia or anhydrosis, but pressure upon the sebaceous glands by the subcutaneous reaction may impart a greasy appearance to the surface. As the infiltration increases in intensity, the normal folds of the skin are obliterated, to be replaced by prominent and irregular corrugations, whilst destruction of the hair follicles causes depilation. This is especially noticeable in the face, where infiltration of the pinnæ, brows and malar and oral regions produces a heavy indurated mask—the so-called leonine facies—completely changing the appearance.

Multiple Infiltrated Lesions.

Indeterminate response produces multiple infiltrated lesions with nerve involvement and well-defined margins resembling the lepride, but spreading peripherally like the leproma. The advancing margins coalesce to create remarkable whorled and serpentine figures scattered extensively over wide areas of the trunk and limbs.

Nerve Trunk Lesions.

When a major nerve trunk is involved, the effects of the pathological process are projected into the skin, muscles, bones and blood vessels in the area of distribution of the damaged axons. Unless a cutaneous lesion is superimposed, lesions of the skin will be wholly referable to nerve damage and mycobacteria will not be demonstrable.

Symptoms vary according to the activity, progress or regression of the lesion and the extent and permanency of the nerve damage.

Early symptoms are numbness and pain in the area of nerve distribution and pain and tenderness along the course of the nerve trunk itself, usually the ulnar or common peroneal. The patient may be unaware of any disability until there appear early trophic lesions in the form of idiopathic blebs and blisters in the skin supplied by the affected nerve, or until the anæsthesia of the area is disclosed by the discovery of trauma following undiscerned laceration or burning.

Examination reveals palpable enlargement of the nerve trunk, impairment of sensibility and later muscular paralyses. Sensation to deep pain, joint sense and the deep reflexes are never lost.

If the reaction to infection terminates in successful elimination of the invading organism, resolution of the lesion takes place, and recovery complete or partial will result, according to the degree of irremediable damage which has taken place. In extreme cases fibrosis or abscess formation may completely and permanently destroy the axons of the nerve trunk.

Late trophic disturbances attributable to impairment of nutrient supply following changes in the blood vessels occur in the hand and foot. In ulnar involvement, atrophy of the thenar, hypothenar and interosseous muscles results in flattening of the palm and exaggerated prominence of the metacarpals. Wasting and fibrotic contraction of the interossei and of the third and fourth lumbricals produce the characteristic *main-en-griffe* with over-extension of the metacarpo-phalangeal joints and fixation of the phalangeal joints of the third and fourth fingers in flexion. A similar involvement of the muscles of the forearm may be followed by wrist drop or wrist distortion.

Osteoporosis with rarefaction of the phalanges and metacarpals (or metatarsals) may proceed to actual absorption with shortening and not infrequently complete disappearance of the bone and consequent mutilation of the hand and foot.

The nails of the fingers and toes in the early stages are thickened and tend to crack across. The epithelial fold of the proximal end of the nail remains adherent to and grows forward with the nail giving it a stunted appearance. The shape of the nail conforms to changes in the bone below, assuming a claw-like appearance as the bone shortens and a greater transverse convexity as it narrows. With the disappearance of the phalanges and even the metacarpals (or metatarsals) the nails may come to lie over the stump of the hand or foot.

The skin of the mutilated hand or foot is atrophic and glossy. The whole process may proceed without ulceration, but trauma and the introduction of pyogenic organisms may lead to septic necrosis and abscess formation with ulceration. In this way the metacarpals and carpals may be lost by septic necrosis in the hand.

The metatarsals are more exposed to and more commonly suffer trauma of this nature than the metacarpals. Bearing the weight of the body, exposed to contusion by irregularities in the ground and already deformed by collapse of the arch following muscle and bone changes, they are in no condition to withstand the damage permitted by anæsthesia. In advanced cases the metatarsals may be completely lost by atrophy and ulceration, the tarsals remaining in a stump covered by atrophic and glossy skin.

Clinical Leprosy.

The stigmata presented by a patient may range from a solitary macule or lepride to extensive areas of heavy lepromatous infiltration accompanied by nerve involvement. Advance of the disease when the indeterminate type of reaction predominates may lead to a condition in which the patient presents all types of lesion together—macule, lepride, leproma and the effects of nerve trunk involvement.

Activity.

The course of leprosy is marked by alternating phases of activity and quiescence. The signs of activity may or may not be accompanied by systemic disturbance; they are (*a*) increase or diminution in the size or number of lesions, (*b*) erythema or infiltration of the lesions, (*c*) demonstrable increase in mycobacteria and (*d*) tenderness of nerves.

Lepra Reaction.

When the immune response is ineffectual, the patient is liable to a violent type of reaction—lepra reaction—which is not experienced when the response is effectual. Its features are (*a*) fever and body pains with œdema of hands and feet, (*b*) the appearance of new and exacerbation of existing lesions with nerve pain and tenderness, (*c*) an eruption of rose spot nodules and evanescent erythematous rashes, (*d*) a conspicuous increase in the number of mycobacteria demonstrable in smears, (*e*) in advanced cases involvement of special organs, the eye, the larynx and the testis, and (*f*) a raised erythrocyte sedimentation rate.

The rose spots vary in size from a pea to a florin, are painful on pressure and in distribution favour the face, back and extensor surfaces of the extremities. They are evanescent, usually disappearing within twenty-four hours, but successive crops may create the illusion of longer duration.

As the condition progresses the patient may experience frequent recurrences of lepra reaction, after each of which his condition is found to have deteriorated, new lesions having become permanent and old ones more extensive. In advanced cases the reaction may endure for months, leaving the patient emaciated and a prey to intercurrent infections, which may prove fatal.

Differential Diagnosis.

The differentiating characters of the lesions in leprosy are: (*a*) in the macule and lepride—impairment of sensation with or without palpable induration of the associated cutaneous nerve; (*b*) in the leproma—demonstration of *M. lepræ* in the lesion.

These are mutually complementary. In the lesion in which it is difficult or impossible to demonstrate *M. lepræ* there is invariable evidence of nerve damage. Conversely, when nerve function is unimpaired, *M. lepræ* can be found in large numbers. Most uncommon cutaneous conditions likely to cause confusion—psoriasis, lupus, *erythema nodosum* and the like—can be excluded by application of these tests. Of other conditions a number warrant special attention.

Tinea.—The lesion of tinea may be mistaken for the macule or the lepride. Distinctive features of tinea are its short history, irritability, absence of anæsthesia, the scaliness of its appearance and its prompt response to treatment. Diagnosis may be confirmed by demonstration of the fungus in the lesion or by biopsy.

Yaws.—Cicatrices following the ulcerations of yaws may be mistaken for macules or leprides. These scars may be hypopigmented, but are not infiltrated. They have no indurated margin, and their sensibility is unimpaired. Mutilations of the hand or foot in yaws may simulate those of neural leprosy. They are, however, occasioned by extensive destruction of tendons and ligaments rather than by trophic disturbances of bone and involve structures unrelated to a particular nerve distribution. The superjacent skin, though hypopigmented and glossy, is not anæsthetic, and there is no involvement of associated nerve trunks.

Syphilis.—The Wassermann and Kahn tests are of little value unless their results prove to be negative. Reliance should be placed upon the history of the condition, the absence of anæsthesia in the lesions, response to antisyphilitic therapy and the results of bacteriological examination of the lesion or biopsy.

Syringomyelia.—Leprous involvement of the ulnar nerve may be mistaken for syringomyelia; in this, however, muscle atrophy precedes sensory impairment, loss of sensation to heat and pain precedes tactile anæsthesia, the nerve trunk is not enlarged or tender, and there is usually spastic paralysis due to pyramidal tract involvement.

Peripheral Neuritis.—Peripheral neuritis is usually to be ascribed to a causative condition, evidence of which can be

elicited—for example, traces of the metal in heavy metal poisoning, or sugar in the urine of the diabetic.

Beriberi.—The neuritis of beriberi is usually symmetrical and predominantly affects motor nerves. Typically the lower extremities are conspicuously involved and the whole of both limbs is affected, the knee jerks being lost. The nerve trunks are not palpably affected. Vitamin *B* cures beriberi, but has no effect in leprosy.

Perforating Ulcer.—Perforating ulcer may be due to tabes, yaws or diabetes. In tabes incoordination, Argyll-Robertson pupil and loss of the knee jerk should be demonstrable. In yaws anæsthesia, if any, will be limited to the site of the lesion and the peroneal nerve will not be indurated. In diabetes glycosuria will indicate the diagnosis.

Bairnsdale Ulcer.—Bairnsdale ulcer is an indolent sloughing post-traumatic ulceration unresponsive to topical medication and attributed to a mycobacterium. Except for satellite lesions beyond the advancing perimeter the lesion is solitary The condition might be mistaken for either of the following: (*a*) Ulcerating lepride. The Bairnsdale ulcer is not anæsthetic, its histopathology reveals none of the characteristics of effectual response, and mycobacteria are readily demonstrated. (*b*) Ulcerating leproma. The histopathology of both conditions is similar; the leproma, however, even if initially solitary, will generally prove to be the precursor of widely dispersed lesions and it will usually be possible to demonstrate mycobacteria in other parts of the body. In contrast to *M. lepræ* the mycobacterium of Bairnsdale ulcer can be grown at 30° to 32° C. and is pathogenic to rodents.

DIAGNOSTIC METHODS.

Testing of Sensitivity.

In testing for hyperæsthesia or anæsthesia, a spill of paper, pledget of wool or pin point should be used. The patient should be stripped and blindfolded and asked to touch the precise point tested. As a preliminary, areas of normal skin should be tested until the responses indicate that the patient understands what is required. Uncivilized aborigines will be terrified by blindfolding, and for these, testing below a sheet pinned at the neck may be attempted. The sophisticated native on the other hand may be over-eager to oblige. In all cases, therefore, to avoid intelligent anticipation, it is desirable to alternate each test of the lesion with a test of normal skin elsewhere on the body.

Bacteriological Examination.

Smears may be stained by the Ziehl-Neelsen method and examined under one-twelfth inch magnification for acid-fast bacilli. They should be taken from a number of sites, including characteristic lesions, the ear lobe, the nasal septum and the eyebrow. For demonstration of the mycobacterium in macule or lepride, an incision should be made into the corium and the base scraped with the point of a blunt scalpel, the debris being spread evenly over a microscope slide. Smears of lepromata may be satisfactorily prepared from simple puncture of the lesion. To obtain specimens from the nose, the lower third of the septum on both sides should be scraped with a blunt scoop. To ensure that acid-fast saprophytes are not mistaken for *M. lepræ*, the specimens should be decolorized with alcohol as well as acid before counterstaining.

Biopsy.

Leprides may be found bacteriologically negative on examination of direct smears, and recourse to biopsy will be necessary. A specimen of skin should be excised to the depth of the subcutaneous tissue and examined in stained sections. Mycobacteria may still not be demonstrable, but the criteria to be sought should be round-cell infiltration of terminal nerve fibrils, around sweat ducts and hair follicles and the typical giant-cell formation characteristic of the lesion.

Wassermann Test.

The Wassermann test is of little value for differentiation from syphilis because the result is commonly positive in cases of advanced leprosy even when there is no question of syphilitic infection.

Lepromin Reaction.

The lepromin reaction, analogous to the tuberculin reaction, although of considerable importance in determining prognosis, is valueless for purposes of diagnosis. The result is invariably positive in cases of the resistant type characterized by leprides and consistently negative in cases of advancing disease with lepromata.

CONCLUSION.

The signs of leprosy at all stages are so distinctive that diagnosis should present no difficulty if the condition is but suspected. In Australia leprosy should be considered as a routine in the differential diagnosis of all cases of subacute or chronic disease associated with macular or infiltrative lesions of the skin or with neuritis.

A history of association with native races or of residence in Northern Australia or the Pacific Islands should arouse suspicion. Amongst immigrants from Malta, Greece, India and China cases are not unusual.

The low infectivity and long incubation period of leprosy lend themselves to its complete eradication by the strict measures of prophylaxis imposed by statute in most Australian States. The sacrifice of so many committed over the past sixty years to strict isolation has largely been rendered vain by the free movement of persons with undiagnosed infective lesions through an unprotected and unsuspecting community.

C. E. COOK,
Canberra.

British Medical Association News.

SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held at the Royal Prince Alfred Hospital, Camperdown, on May 21, 1953. The meeting took the form of a series of clinical demonstrations by members of the medical and surgical staffs of the hospital. Part of this report appeared in the issues of October 31 and November 7, 1953.

Use of Ultrasonic Therapy.

DR. T. W. BURGESS showed a man, aged seventy-one years, who had attended the hospital out-patient department on October 28, 1952, complaining of a dull pain for five days in both shoulders and the neck. A provisional diagnosis of muscular rheumatism was made, and treatment by local application of heat and an analgesic mixture was prescribed. The pain gradually extended peripherally along the arms and was increasing in intensity. On January 29, 1953, he was transferred to the orthopædic out-patient department. He now had stiffness of the neck and shoulders, and both hands were swollen with early thickening of the palmar fascia. Radiant heat and exercises were given to both shoulders and the cervical part of the spine and wax baths to the hands, but the condition became worse, and he was referred to the arthritis clinic on March 5, 1953. The pain in both shoulders and neck was now severe, and he had severe limitation of movement of the arms, being able to abduct both arms approximately 10° from the sides of his body. Blood examination showed a hæmoglobin value of 12·5 grammes *per centum*, a leucocyte count of 5250 per cubic millimetre and an increased sedimentation rate. X-ray examination of his shoulder joints showed calcification in the tendon above the greater tuberosity in the right shoulder joint, with slight senile decalcification and very slight evidence of osteoarthritic changes in both joints. Ultrasonic treatment was given to the shoulder and cervical regions three times weekly. At the time of presentation at the meeting he had received eleven treatments in all. He was now able to extend both arms above his head, and movements in other directions were similarly increased. The pain was much less; and whereas before the treatment he had been awakened at night by the pain, he was now able to sleep without waking. He was to receive further treatment.

Post-Cricoid Carcinoma.

DR. F. W. NIESCHE showed a woman, aged sixty-six years, who had undergone laryngo-pharyngectomy (the Wookey operation) for post-cricoid carcinoma. Her history was that she had had increasing difficulty in swallowing for six months. She had first noticed difficulty in swallowing solid foods with a sensation of block in the upper part of her throat. This difficulty increased until fluids also gave trouble if swallowed too quickly, and she had to regurgitate both fluids and solids on occasions. She also complained of

pain in the throat passing to the ears for about two months, and in the six months before admission to hospital she had lost one and a half stone in weight. There were no other relevant symptoms referable to the alimentary system or to other systems. She had been treated for two years for pernicious anæmia. She was admitted to hospital during March, 1953. An X-ray examination showed narrowing of the œsophagus in the post-cricoid region. Œsophagoscopy was performed, and a stricture and nodular tumour were seen about the level of the cricoid cartilage. Biopsy proved the tumour to be a low-grade squamous carcinoma; it appeared to be encircling the œsophagus at the level of the cricoid cartilage. On March 18, 1953, the patient had a first-stage Wookey operation for laryngo-pharyngectomy. A flap of skin was turned in to form a "skin tube", and the severed trachea was passed through a separate stab wound. A skin graft was applied to the residual raw area. Convalescence was very satisfactory. The second stage of the operation was performed six weeks later. A plastic operation was performed on the neck with closure of the œsophageal tube. The wound healed by first intention, and at the time of the meeting the patient could swallow comfortably.

Malignant Melanoma of Calf.

Dr. Niesche next showed a woman, aged thirty-six years, who had been admitted to hospital during January, 1947. She had noticed rapid enlargement of a mole on her right calf which had previously been present as long as she could remember. It was considered to be malignant and was excised widely, the pathological report confirming the diagnosis of malignant melanoma. There was no evidence of secondary lymph-node involvement, or of metastases in liver or lungs. The patient was discharged from hospital.

During August, 1947, the patient was readmitted to hospital, having noticed enlargement and slight tenderness of a lymph node in the groin. The gland did not appear to be fixed. It was removed under local anæsthesia, and was shown histologically to contain melanomatous metastases. Radical excision of the iliac and aortic lymph nodes was decided upon. That was performed through a long incision from the groin to the right mid-zone of the abdomen. The tissues containing the lymph nodes along the external iliac vessels and aorta were dissected out in a continuous chain as far as the renal vessels. The glands were seen to change in colour from black to grey as the higher levels were reached, and in the upper glands no discoloration was seen. The histological report confirmed the impression that metastases were progressively less in the glands as higher levels were reached, and in the upper nodes no deposit was found.

Dr. Niesche said that the patient had since been well over a six-year follow-up period and at the moment had no evidence of further metastasis.

Large Duodenal Diverticulum Causing Obstruction.

Dr. Niesche's last patient, a woman, aged sixty-three years, had been admitted to hospital during May, 1953. In the previous twelve months she had had recurrent attacks of vomiting after every meal. Frequently she had pain in the epigastrium following a meal, but that was variable and not pronounced. She had lost about one stone in weight over the twelve months. There were no other symptoms referable to the alimentary system and no other relevant symptoms referable to other systems. A barium meal examination showed no abnormality of the stomach, but there was gross dilatation of the first, second and third parts of the duodenum due to a severe degree of obstruction about the middle of the third part. A large diverticulum was present arising from the duodenum at the duodeno-jejunal flexure. At operation it was found that the duodenum was grossly dilated and contained one large diverticulum near the duodeno-jejunal flexure and three smaller ones in the concavity of the duodenum. It was obvious that if the large diverticulum became distended, obstruction of the third part of the duodenum would follow. The three largest diverticula were removed, and duodeno-jejunostomy was performed proximal to the site of obstruction. The patient's recovery was delayed by mild ileus, but her convalescence was quite satisfactory now. At the time of the meeting she had no discomfort following meals.

Rectal Carcinoma and Ischio-Rectal Abscesses.

DR. J. E. D. GOLDIE showed a man, aged forty-nine years, who had had a carcinoma of the rectum which presented as a number of ischio-rectal abscesses. The patient had a six months' history of tender swelling around the anal margin and a three months' history of discharging sores, which occasionally bled, and irregular bowel action. He had no weight loss or abdominal pain. Examination of the patient revealed the presence of inflammation around the anus and a large discharging abscess in the left lateral position resembling a furuncle; three small abscesses were situated medially to the large abscess. Rectal examination revealed the presence of a fungating ulcerated growth. The abscess was incised, drained and packed. Eight days later, a synchronous combined abdomino-perineal resection was performed, the abdominal approach being taken by Dr. Goldie and the perineal approach by Dr. E. V. Barling. After operation, Wangensteen suction, intravenous fluid therapy and the use of an indwelling catheter were maintained for one week. Convalescence was uneventful apart from a low grade urinary infection which responded satisfactorily to chloramphenicol therapy.

Foreign Body in the Rectum.

Dr. Goldie's second patient, a man, aged twenty-six years, had attended his local practitioner complaining of alternating diarrhœa and constipation for one week. Medical treatment was said to have afforded temporary relief, but the diarrhœa persisted, accompanied by increasing lower abdominal discomfort. Six weeks after onset of the symptoms the patient was referred to the Repatriation General Hospital, Concord, since he had served in the Navy during the war. The provisional diagnosis was carcinoma of the rectum, but sigmoidoscopic examination revealed that the obstruction was caused by a piece of wood. The Repatriation Commission considered that the disability was not due to war service, and referred the patient to the Royal Prince Alfred Hospital. There the patient gave a history of anorexia, diarrhœa, incontinence of fæces and urine and loss of weight. He also said that he was "rather homosexual" and had been in the habit of placing a piece of wood in his rectum; on the last occasion, seven weeks before admission to hospital, he had been unable to remove it. Previously he had failed to mention the presence of the piece of wood when seeking treatment. On examination, the patient appeared to be anxious and emaciated, and to be suffering from severe discomfort. Rectal examination revealed an object one inch in diameter, one and a half inches from the exterior, and fixed in position. No other abnormalities were detected. Under "Pentothal" anæsthesia the object was removed by traction with bone forceps assisted by digital manipulation. Subsequent examination by sigmoidoscope revealed no trauma. Convalescence was uneventful.

Hæmangioma in Capsule of Knee Joint.

DR. L. J. WOODLAND showed a man, aged twenty-one years, who, when first examined in January, 1952, had complained of pain on the inner side of the left knee associated with a recurrent slight swelling in that region for ten years. He had visited many hospitals and had had many types of treatment, but his condition had become progressively worse. On examination of the patient it was noted that the muscles of the left thigh, particularly the quadriceps, were very wasted. The left thigh measured three inches less in circumference than the right, and there was minimal diffuse thickening of the capsule of the knee on the inner side, with extreme wasting of the *vastus medialis*. The patient complained of exquisite tenderness on light palpation over the medial femoral condyle and medial border of the left patella. Extension of the knee was about 5° less than normal. Flexion was possible only to 90°. X-ray examination of the left knee joint revealed no bony abnormality. As the condition did not improve with resisted quadriceps exercises, operation was undertaken on October 3, 1952. The pre-operative diagnosis was one of localized fibrosis on the inner side of the knee capsule of unknown origin. At operation a cavernous hæmangioma, involving the lower end of an atrophic *vastus medialis* muscle and the capsule of the knee joint on the inner side, was excised. The hæmangioma did not involve the synovial membrane. The post-operative convalescence was uneventful. The operation completely cured the pain; and, when examined on the day before the meeting, the patient had regained considerable muscle volume and power. The left thigh now measured only one inch less in circumference than the right. Extension of the knee was now normal, and he was able to flex it through 130° to 50°.

From his experience in this case and the symptoms and signs met with in another young patient, Dr. Woodland considered that in some cases, when a hæmangioma affected muscles or capsules of joints, a clinical syndrome might be recognized. It was characterized by an area of extreme, almost thalamic, tenderness in the region of a joint, restriction of movement of that joint and extreme wasting of

muscles around the joint, and absence of gross pathological change in the joint.

The Operative Treatment of Hip Conditions.

Dr. Woodland then showed four patients illustrating the operative treatment of some hip conditions.

The first, a boy, aged fifteen years, had been first examined in 1950. He gave a history of pain for seven years and known tuberculous infection for six years in the left hip, which had been immobilized in plaster of Paris casts. At that time X-ray examination showed quiescent tuberculous arthritis of the hip, and several tuberculous abscesses had calcified. The lower femoral and the upper tibial epiphyses had fused. The left lower limb measured four and a quarter inches less in length than the right. Ilio-femoral arthrodesis was successfully accomplished in four months by means of a graft taken from the tibia. Because of prolonged immobilization when the patient commenced to bear weight on the left lower limb, a stress fracture occurred in the supracondylar region of the left femur, and later a valgus deformity without fracture occurred about the middle of the tibia. When some recalcification had occurred, in August, 1952, the lower femoral and upper tibial and fibular epiphyses of the right leg were curetted, and bone grafts were inserted. Before operation the left lower limb measured five and a half inches less in length than the right. The disparity between the lengths of the lower limbs had not been lessened by operation.

Dr. Woodland considered that the patient illustrated that ultraconservatism in the shape of prolonged immobilization was undesirable in the treatment of tuberculosis of the hip. Extreme decalcification due to prolonged immobilization led to fatigue fracture above the knee and to valgus deformity of the tibia when weight-bearing was commenced. In the present case premature fusion had occurred in the lower femoral and the upper tibial epiphyses, but the upper fibular epiphysis was unaffected. In consequence, the fibula continued to grow and became "S"-shaped. In the middle half of the leg the fibula was medial to the tibia. Dr. Woodland also pointed out that efforts to arrest epiphyseal growth on the sound side should be undertaken before the age of fourteen years if any reduction in the disparity between the two lower limbs was to be seen. In this case increasing disparity was probably prevented, but improvement was not likely to occur. When growth had ceased it would be considered whether shortening of the right thigh three inches by subtrochanteric osteotomy and plating was worth while. Because of the extreme fragility still present in the left lower limb, it was considered that any leg-lengthening procedure on the left lower limb was, at least at present, inadvisable.

Dr. Woodland's next patient was a woman, aged forty-six years, who when first interviewed in July, 1952, gave a history of pain over the outer side of the right hip for three to four years. When examined at that time she was unable to move the right hip actively or passively in any direction. There was no material flexion or adduction deformity. Flexion of the left hip was possible only through 90°, and rotation was slightly restricted. She had a considerable degree of osteoarthritis in the right hip and a mild degree in the left hip. There was no evidence of osteoarthritis elsewhere, and it was considered that the osteoarthritis in the hips was secondary to mild slipped epiphyses in adolescence. In November, 1952, by a lateral incision, the right hip was approached, portion of the head of the femur removed and an acrylic head inserted. Convalescence was uneventful. Now, six months after the operation, movements of the right hip were practically normal and were greater than movements in the left hip, the site of a mild degree of osteoarthritis.

Dr. Woodland pointed out that to obtain a good result following acrylic head arthroplasty, vigorous physiotherapy was necessary. Particularly was it important to prevent flexion deformity of the hip.

Dr. Woodland's next patient was a woman, aged sixty-eight years, who had a history of pain and stiffness in both hips for about ten years. Three years previously at another hospital she had had "cups put in both hips". Subsequently she walked, but with difficulty and only with the aid of crutches. When first examined in April, 1953, she had complained of severe pain in the right hip ever since the operation in 1950. That was noticed mainly on use. When she was examined it was found that there was 30° of flexion deformity in both hips, and all movements were about one-sixth normal. X-ray examination showed a valgus position of the neck of the right femur with the vitallium cup looking like a cap on the side of a head. On April 17, 1953, the right hip was approached through the previous anterior Smith-Petersen incision. The cup was removed. The subjacent head was found to be covered with white cartilage, which looked like hyaline cartilage, but it was softer to the touch than normal hyaline cartilage. Portion of the head was removed, and an acrylic head was inserted. Now, four weeks after the operation, the patient stated that the post-operative discomfort after insertion of an acrylic head was much less than that after mould arthroplasty; and movement had increased.

Dr. Woodland's last patient was a woman, aged fifty-five years, who, when interviewed in 1950, had given a history of pain and stiffness in various joints over a period of fifteen years. She complained particularly of pain and stiffness in the left hip for nine years. The pain was unrelieved by injections of lactic acid into the hip joint. X-ray examination showed considerable degenerative arthritis of both hips and of the lumbar part of the spine. Because her main complaint was of pain in the left hip which interfered with sleep, and because in his experience "vitallium cup" mould arthroplasty had not given good results in patients with generalized osteoarthritis, Dr. Woodland performed arthrodesis of the left hip on March 3, 1950. The hip was approached by a Watson-Jones type of incision, and arthrodesis was performed by the Wilson technique. In addition a Smith-Petersen nail was driven through the neck of the femur into the ilium. The hip was rested in a long double hip spica for three months and a short bilateral hip spica for two months. By that time firm bony ankylosis had been obtained.

Dr. Woodland pointed out that in general arthrodesis in a single joint was inadvisable in the presence of generalized osteoarthritis. In the present case the patient had been completely relieved of pain in the left hip and pain had not increased in other joints. In the present state of knowledge the patient would probably have been better treated by insertion of an acrylic head. It was true that fusion of one joint put undue strain on neighbouring joints, particularly when an active life was led, but the future in relation to acrylic heads had yet to be determined.

Malignant Tumours Involving Orbit.

DR. D. OFFICER BROWN presented two patients in whom radical subperiosteal exenteration of the orbit was required as part of the excision for facial malignant disease. The first, a man, aged sixty years, gave a short history of rapidly increasing orbital swelling with a firm mass evident on the lateral aspect. No preliminary biopsy was carried out. The diagnosis of carcinoma of the lachrymal gland was confirmed by examination of microscopic sections, which were demonstrated. Immediate repair was performed with a "blocking out" forehead flap based on the temporal blood supply. Healing was completed in two operations separated by an interval of two weeks.

The second patient was a boy, aged eight years, in whom a nodular growth below the inner canthus of the eye had been removed elsewhere on two occasions and recurred each time. Pathological examination of sections had indicated a high degree of malignant change, but a doubt regarding the exact nature. Upper cervical glands had been enlarged, and X radiation had been given about the facial tumour and to the glands. Since the last recurrence growth had been rapid and had extended round the inner canthus into the upper lid with considerable fixation. Radical excision with total exenteration of the orbit was carried out, and immediate repair with a large forehead flap was completed in two stages with an interval of two weeks between operations. Cervical glands were again evident, and it was intended that they should be excised in the near future. Pathological examination of sections showed neuroblastoma. Full investigation, including adrenal air studies, had failed to demonstrate any distant primary condition, and it was suggested that the tumour was itself a primary condition occurring in ectopic nerve tissue.

Leg Ulceration.

Dr. Officer Brown's third patient was a girl, aged twenty years, with destructive leg ulceration shown to be due to the *Mycobacterium ulcerans* (Bairnsdale bacillus), an acid-fast bacillus identified in recent years and described from Victoria. After six months' treatment the condition was becoming stabilized, and a pedicle had been prepared for definitive grafting in the near future.

Fracture of Maxilla and Mandible.

Dr. Officer Brown's fourth patient had had a severe middle third facial fracture with fracture of the mandible. Examination of the maxilla had shown mobility and considerable

displacement, and treatment had of necessity included (*a*) bilateral temporal elevation, (*b*) wiring of the right fronto-malar junction, (*c*) elevation and packing for ten days of the right antrum, (*d*) elevation and fixation of the nasal bone structure, (*e*) application of upper and lower cast metal splints, (*f*) fixation of upper dental splints to the plaster head cap, and (*g*) forward traction with nasal wire to the plaster head cap. Reduction appeared complete and satisfactory. The maxillary fixation would be required for about two to three weeks and the mandibular splint for about five to eight weeks.

Pelvic Abscess and Pyosalpinx with Early Cervical Carcinoma.

DR. M. B. MCILRATH showed a woman, aged forty-seven years, who had been admitted to hospital on January 17, 1953. Her history was that on December 12, 1952, she had developed a pain in the lower part of the back and both iliac fossæ; it persisted for four days and then passed off. A fortnight later, a similar pain was experienced, but after three days she passed some pus *per vaginam* and the pain eased. She then passed bright blood for three days. On January 13, 1953, the pain recurred and persisted up to the time of her admission to hospital. Investigation of the patient's previous history revealed that she had suffered abortion after a four months' pregnancy in 1929, and she had had a retroversion operation in 1934. Examination of the patient on the present occasion revealed tenderness in the left iliac fossa. Vaginal examination revealed hard masses in both lateral fornices, a mobile and tender uterus, and an eroded cervix with yellow pus exuding from the external os. After her admission to hospital the patient's temperature record was "swaying" in character, and on January 19 a pelvic abscess was diagnosed. On January 22 an abdominal extension of the abscess was detected and the pathologist reported the presence of *Staphylococcus aureus* in the pus. On January 28 the induration on the left side was found to be ascending up beside the uterus and over the left Fallopian tube. Short-wave therapy was applied to the pelvis. On February 6 posterior colpotomy was carried out, and eight ounces of pus were drained from the abscess. Total hysterectomy was carried out with a double salpingo-oophorectomy and appendicectomy. Examination showed the presence of acute right salpingo-oophoritis, an abscess of the left ovary and a left pyosalpinx with adhesions. During convalescence the patient developed paralytic ileus and infection of the wound, but these were overcome. The pathologist reported the presence of squamous carcinoma of the cervix and subacute salpingitis, and on March 6 biopsy of the cervical remnants was carried out with insertion of radium. Pathological examination of biopsy specimens revealed the presence of granulation tissue, but no carcinoma. On April 22 a modified Wertheim's operation was carried out with pelvic lymphadenectomy and excision of the remnant of the cervix and the upper part of the vagina. The bladder was cut during the operation, and an indwelling catheter was inserted. During convalescence, the patient again developed paralytic ileus, but this was treated successfully. On May 3 the pathologist reported the presence of a profuse quantity of *Bacillus coli* in the urine, and treatment was given with streptomycin. Subsequent convalescence was uninterrupted.

Radiological Demonstration.

DR. E. A. BOOTH presented a demonstration of X-ray films. The first series related to renal tracts in pregnancy and included the following: the renal tract of the normal, non-pregnant female; the renal tract of early pregnancy, showing normal physiological dilatation of the renal tracts; the renal tract of normal late pregnancy showing physiological dilatation; the appearance in a case of toxæmia during advanced pregnancy with absence of physiological dilatation; the appearances associated with pyelitis of pregnancy with excessive dilatation of the pelvi-calyceal systems; multiple calculi in the right kidney during pregnancy.

The second series dealt with the estimation of fœtal age. Dr. Booth explained that at the King George V Memorial Hospital estimation of fœtal age was carried out most carefully on the basis of ossific development. To illustrate it, he showed films of the fœtus at the age of twelve weeks, sixteen weeks, thirty-six weeks and forty weeks. He explained that at twelve weeks about the earliest fœtal parts could be seen. Pregnancy might be confirmed at that stage, but could not be entirely excluded if fœtal parts were not visible, as they were quite small and indistinct. The main ossific centres used were those of the talus and calcaneus which were well shown by the thirty-second week, those of the distal femoral epiphysis at approximately the thirty-fourth to thirty-sixth week, and those of the proximal tibial epiphysis at the fortieth week. Dr. Booth pointed out that the method was not accurate and served as a means of estimating fœtal maturity rather than age. He said that many other ossific centres and other methods were available, but those that he had described seemed to serve most practical requirements.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

GOVERNOR MACQUARIE TO THE COMMISSIONERS OF THE TRANSPORT BOARD.

[*The Historical Records of Australia*, Series I, Vol. VIII.][1]

Government House,
Sydney,
10th October, 1814.

Gentlemen,

I have to inform you that the Male Convict Ship Surrey arrived here on the 28th July last, the principal part of the Crew and Convicts being in a wretched and deplorable State of Disease. On the passage hither an infectious fever first exhibited itself among the convicts and eventually extended to the Ship's Crew and Officers and to a Detachment of the 46th Regt. destined for this place. The Mortality which has been the consequence is very great, 36 Convicts died, as also the Captain of the Ship, the 1st and 2nd Mates, the Boatswain and six Seamen besides 1 Sergeant and 3 Privates of the Military Detachment: in all Fifty Persons.

I have much reason to apprehend that this destructive Disease originated in the mismanagement of two of the unfortunate Sufferers, namely the Captain and Surgeon whose Duty it was equally to have caused the Convicts to be brought more frequently and in greater numbers on Deck than it appears they thought proper to authorize. It may be remarked here that unless the unfortunate Convicts in Prison Ships are frequently brought on Deck to enjoy the benefit of fresh air and the Berths below thoroughly washed, cleaned and ventilated, Disease must be the consequence. On the present occasion it appears that there were never more than 50 Convicts permitted to come on Deck at once and very seldom more than 30 to 40. The greater proportion of 150 to 170 being thus left constantly below, it was of course totally impossible that the berths could be cleansed and purified, as they ought to be and still much more so that they could be ventilated whilst such a number of persons remained there.

For your further information on this subject I beg to refer you to the Report[2] of Mr. Redfern, Assistant Surgeon

[1] From the original in the Mitchell Library, Sydney.

[2] Redfern's report, which is very lengthy, concludes with the following recommendations:

1. That more warm clothing be provided for the Winter passage.
2. That more regard be directed towards personal cleanliness by facilitating the means of washing and cleaning their persons and dress.
3. That cold affusion be employed as largely as possible.
4. That Masters of Transports be prohibited purchasing or exchanging, unless by direct instructions of the Transport Board, any part of the Ration of the Convicts.
5. That a different distribution or rather an increase of the quantity of the convicts' Wine be provided for.
6. That no reduction, unless under peculiar circumstances, of the regulated allowance of water be suffered.
7. That no part of their rations of Articles of Comfort be surreptitiously withheld.
8. That in Order to prevent the generation of Contagion it is absolutely necessary that the convicts with their bedding should be admitted every day, when the weather will permit, on the deck for a certain time, the longer the better.
9. That the Prison and Hospital be regularly cleansed and fumigated with the Nitric or Muriatic Acid in a gaseous State: That the fumigation be as perfect and as general over the ship as possible, Well Airing and Drying the prison before the Convicts are sent below.
10. That for better preservation of the health of the Convicts more eligible Medical Attendants and on a different establishment be provided.
11. That an Agent for Transports be sent out in whose person might be combined the two offices of Agent and Principal Medical Officer, invested with powers to cause the necessary regulations to be carried into effect.

on this Establishment, and have only to express the hope that you will give this Report of the Fatal Consequences attending the rigid and unfeeling Conduct of the Captain and Surgeon the Consideration due to the distressing circumstances detailed in it and that you will give such instructions to the Masters and Surgeons of other Convict Ships as may tend to avert the recurrence of such Calamities for the future.

I have, etc.,
L. MACQUARIE.

Correspondence.

JOHN ADEY FUND.

SIR: Attached hereto please find list of contributions to the John Adey Fund, as supplied by the University of Melbourne. *The response to this appeal has been encouraging* and we look forward to being able to establish a prize of some sort in psychiatry. All who are interested in *encouraging students and young graduates to interest themselves* in psychiatry, and all who would like to associate themselves with this honour to John Adey are invited to *subscribe. Contributions should be paid to "University of* Melbourne: Adey Fund" and addressed to the Registrar, University of Melbourne, Carlton, Victoria. We will ask *you to publish further acknowledgements as they come to* us from the University.

Yours, etc.,
J. V. ASHBURNER,
President, Mental Hospitals Medical Officers' Association.

Mental Hospital,
Kew, E.4,
Victoria.
October 27, 1953.

Dr. Una B. Porter £50, Dr. Vincent Youngman £20, Dr. J. V. Ashburner £10 10s., Dr. J. F. J. Cade £10 10s., Dr. R. S. Ellery £10 10s., Dr. Marjorie Gilchrist £10 10s., Dr. Euan MacLean £10 10s., Dr. V. L. Matchett £10 10s., Dr. Ainslie Meares £10 10s., Dr. A. R. Phillips £10 10s., Dr. R. R. Webb £10 10s., Dr. J. F. Williams £10 10s., Dr. E. Cunningham Dax £7 7s., Dr. C. R. S. Brothers £5 5s., Dr. J. Catarinich £5 5s., Dr. S. P. Derham £5 5s., Dr. J. R. V. Foxton £5 5s., Dr. J. A. Goding £5 5s., Dr. F. W. Graham £5 5s., Dr. Mildred Green £5 5s., Dr. W. E. Jones £5 5s., Dr. R. Kiel £5 5s., Dr. G. B. Murphy £5 5s., Dr. E. Seal £5 5s., Dr. Guy Springthorpe £5 5s., Dr. H. C. Stone £5 5s., "Medical Officer", £5 5s., Dr. C. W. Noack £5, Dr. H. K. B. Bailey £5, Dr. G. A. Wright £5, Dr. K. M. Walsh £3 10s., Dr. J. H. Hurt £3 3s., Dr. F. G. Prendergast £3 3s., Dr. D. Roseby £3 3s., Dr. W. A. Brady £2 2s., Dr. W. A. Dibden £2 2s., Dr. E. E. Dunlop £2 2s., Dr. H. J. C. Edmonds £2 2s., Dr. C. Farran-Ridge £2 2s., Dr. de Winton Murdoch £2 2s., Dr. E. A. North £2 2s., Dr. E. A. Roberts £2 2s., Dr. J. S. A. Rogers £2 2s., Dr. W. G. Sinclair £2 2s., "Mental Hygiene Medical Officer" £2 2s., "Mental Hygiene Medical Officer" £2 2s., Dr. K. M. Benn £1 1s., Dr. S. Crawcour £1 1s., Dr. M. Delatycki £1 1s., Dr. H. C. Disher £1 1s., Dr. D. M. Salter £1 1s., Dr. F. Douglas Stephens £1 1s., Dr. G. D. Williams £1. Total: £316 6s.

POLIOMYELITIS AND TONSILLECTOMY.

SIR: Too many careful papers have been published on this subject for there to be the slightest doubt that if a patient contracts poliomyelitis after tonsillectomy he is more likely to develop the bulbar than the spinal variety of the disease than if tonsillectomy had not been performed. Unfortunately this has been accepted in too many quarters to mean that tonsillectomy should not be performed, or at any rate not in "polio" epidemics (a difficult period to be sure of in a disease that so resembles the poor, in being always with us).

It is time a more reasonable balance in the assessment of risks should be made than has been advocated in the last few years. As an example, the danger of road risks to patients whilst sitting in our waiting rooms is absolutely nil; yet this does not deter their returning home after a consultation. Similarly I am sure statistics could be compiled to show cephalic tetanus is commoner in recently tonsillectomized patients than others, but no one would dream of advising avoiding a necessary tonsillectomy because of this, nor would anyone even go as far as to recommend sidestepping such an operation at the times of the year when tetanus occurs more frequently. Yet I have seen many children suffering from acute or chronic ill health sufficiently severe to be a direct or indirect menace to life (and more frequently severe enough to damage their health) denied the benefit of tonsillectomy because an epidemic of poliomyelitis existed or has existed at some time, even perhaps years before. The risks such children run by being denied treatment is frequently many times greater than that run in receiving treatment and braving infection with bulbar poliomyelitis.

In order to assess the practical risks of infection after tonsillectomy I have discussed the matter with numerous oto-rhino-laryngologist colleagues and discovered that most of their experiences run very parallel to mine. In an extremely busy twenty-eight years of such practice I have not known a single case of any variety of poliomyelitis follow closely enough on tonsillectomy to be suspected of any connexion with it, and in our community it is unlikely that such could occur without my attention being drawn to it. True I did have a fright when a case was admitted to hospital as a suspected bulbar poliomyelitis a couple of weeks after tonsillectomy, but it was discharged within two days as diagnosed incorrectly and had no further trouble.

I have also inquired, in reverse, by asking Dr. Alan Roberts, who would see all poliomyelitis cases in the sole isolation hospital in the district. He was asked how many of the poliomyelitis cases he had seen had had a recently performed tonsillectomy. His reply was that over a longer period than mine he had had only one suspected case, which also had been wrongly diagnosed.

The incidence of poliomyelitis soon after tonsillectomy therefore appears so uncommon that the statistical proof that bulbar cases are out of proportion to spinal ones, should infection occur, comes into correct perspective.

On the other hand the mortality from denied tonsillectomy is hard to assess. The development of fatal endocarditis, septicæmia or nephritis does not bring the cases back to the oto-rhino-laryngologist, whilst late development of chronic nephritis, arteriosclerosis and the various complications thereof occur too late to be brought to one's notice. The tremendous immediate improvement in the general health of most tonsillectomy cases when properly selected for treatment suggests that the figures might be considerable.

Where acute illness from tonsil disease exists, I would have no compunction in ignoring a severe poliomyelitis epidemic if it existed, but less severe cases would be advised to wait whilst such an epidemic declined.

The late susceptibility of tonsillectomized patients to bulbar poliomyelitis, I think, simply stresses the emphasis that all reputable practitioners in our art have for some time put on the importance of not removing tonsils that do not really have proper indications for their removal.

Yours, etc.,
A. B. K. WATKINS.

Bolton Street,
Newcastle,
New South Wales.
October 26, 1953.

Post-Graduate Work.

PSYCHIATRIC TRAINING AT McGILL UNIVERSITY.

THE Department of Psychiatry, McGill University, Montreal, has a limited number of openings for training, and applications are now being considered. Applicants must have graduated from an acceptable medical school and have had a general internship of one year. The four-year course provides a general basic preparation during the first two years. The last two years provide special patterns of instruction for those (*a*) planning to enter the field of general hospital, community or university psychiatry, (*b*) preparing themselves for a career in child psychiatry, and (c) intending to enter the field of research psychiatry. Credit may be allowed for previous training. Shorter periods of instruction may be arranged, as well as instruction in special fields. Those accepted for training are assigned to one of the seven university teaching areas in Montreal. These positions carry with them board and lodging, *plus* an honorarium ranging from $25 to $50 a month, which is the basic stipend. In several centres additional emoluments of a further $1800 a year are available, provided certain conditions are fulfilled. Applicants should write to the Chairman of the Department of Psychiatry, McGill University, Montreal, Canada. The opening date for the new session is July 1, 1954.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

Week-End Course at Bega.

THE *Post-Graduate Committee in Medicine* in the University of Sydney, in conjunction with the Far South Coast and Tablelands Medical Association, will hold a week-end course at Bega on Saturday and Sunday, November 14 and 15, 1953, as follows:

Saturday, November 14: 2 p.m., registration; 2.15 p.m., symposium: "Recent Advances in Therapeutics", Professor F. H. Smirk and Dr. A. W. Morrow; 3.45 p.m., "The Diagnosis and Treatment of the Commoner Dermatoses", Dr. E. J. C. Molesworth.

Sunday, November 15: 9.30 a.m., symposium: "Renal Disease", *Professor F. H. Smirk and Dr. A. W. Morrow;* 11 a.m., "The Characteristics of Some Tumours of the Skin", Dr. E. J. C. Molesworth; 2 p.m., "Eye Conditions Met in General Practice", *Dr. J. D. Lodge.*

By courtesy of the Royal Prince Alfred Hospital, Professor F. H. Smirk, M.D., F.R.C.P., F.R.A.C.P., Professor of Medicine, *University of Otago, Dunedin,* and the William McIlrath Guest Professor, is participating in this course.

The fee for attendance at the course will be £3 3s. Those wishing to attend are requested to notify Dr. E. C. Blomfield, Honorary Secretary, Far South Coast and Tablelands Medical Association, 104 Gipps Street, Bega, New South Wales.

Research.

GORDON CRAIG FELLOWSHIP IN UROLOGY.

APPLICATIONS are invited for the Gordon Craig Fellowship in Urology. The Fellowship is tenable at the University of Sydney, Department of Surgery, and at the Department of Urology, Royal Prince Alfred Hospital, for a period of three years from January, 1954. The value of the Fellowship is £600 *per annum* and includes residence in the Royal Prince Alfred Hospital. Application should be made to the Registrar of the University of Sydney before November 30, 1953.

Australian Medical Board Proceedings.

NEW SOUTH WALES.

THE following have been registered, pursuant to the provisions of the *Medical Practitioners Act, 1938-1950,* as duly qualified medical practitioners: Hughes, John Burnell, M.B., B.S., 1952 (Univ. Adelaide); Grant, John Halford, M.B., B.S., 1946 (Univ. Queensland); Macpherson, James Ramsay, L.R.C.P. (Edinburgh), 1951, L.R.C.S. (Edinburgh), 1951, L.R.F.P.S. (Glasgow), 1951.

The following additional qualifications have been registered: Burns, Francis Harding (M.B., B.S., 1948, Univ. Sydney), M.R.A.C.P., 1953; Grieve, David Amor Harvey *(M.B., B.S., 1947, Univ. Sydney), D.Obst.R.C.O.G., 1952;* Cooley, Beryl Glover (M.B., B.S., 1936, Univ. Sydney), D.P.M., 1946, Univ. Sydney; Rickard, Nancy Catherine (M.B., B.S., *1945, Univ. Sydney), D.T.M. & H., 1950, D.P.H., 1953, Univ.* Sydney.

TASMANIA.

THE following have been registered, pursuant to the provisions of the *Medical Act, 1918, of Tasmania,* as duly qualified medical practitioners: Ainslie, Margaret Grace M., L.A.H. (Dublin), 1952; Wilson, Geoffrey Campbell, M.B., B.S., 1937 *(Univ. Melbourne).*

The following have been granted licence to practise medicine and surgery in Tasmania for 12 months, under the amending *Medical Act* of May, 1951: Clemente, John

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED OCTOBER 10, 1953.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	6(1)	3(2)	..	..	..	..	..	..	9
Amœbiasis	..	..	..	..	..	..	..	..	..
Ancylostomiasis	..	..	5(5)	..	..	..	..	..	5
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	..	1	..	1	..	..	..	..	2
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	2	..	..	..	..	..	..	..	2
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	1	5(3)	5(4)	..	..	..	..	..	11
Diphtheria	3(2)	3(3)	2	..	1(1)	..	..	..	9
Dysentery (Bacillary)	..	..	..	..	..	..	..	..	..
Encephalitis	1	..	..	..	..	..	..	..	1
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	1	..	..	..	..	..	..	1
Infective Hepatitis	..	18(4)	..	..	7(3)	..	..	..	25
Lead Poisoning	..	..	..	..	..	..	..	..	..
Leprosy	..	1(1)	..	..	5	..	1	..	7
Leptospirosis	..	..	2	..	..	..	..	..	2
Malaria	..	..	..	..	1(1)	..	..	..	1
Meningococcal Infection	2	1(1)	..	1(1)	2(1)	2	..	..	8
Ophthalmia	..	..	..	..	1	..	..	..	1
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	6(4)	3(2)	1	1	..	..	..	..	11
Puerperal Fever	..	..	..	..	..	..	..	..	..
Rubella	..	16(11)	..	..	58(41)	..	..	..	74
Salmonella Infection	..	..	..	..	..	..	..	..	..
Scarlet Fever	6(4)	25(16)	6(4)	..	1(1)	1	..	..	39
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	..	2(1)	..	..	..	..	..	2
Trachoma	..	..	..	..	..	..	..	..	..
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	41(31)	19(10)	26(16)	5(3)	6(3)	4(1)	..	..	101
Typhoid Fever	1	3(3)	..	1	..	..	..	..	5
Typhus (Flea-, Mite- and Tick-borne)	..	..	5(1)	..	..	..	..	..	5
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

Fausto, Doctor in Medicine, Doctor in Surgery (Univ. Bari, Italy); Endelmanis, Arvids A., M.D., 1946 (Univ. Hamburg); Jerums, Juris F., M.D., 1931 (Univ. Riga); Matysek, Charles, M.D., 1943 (Univ. Prague); Sulyi, Karoly D. N., M.D., 1940 (Univ. Budapest).

Notice.

FELLOWSHIP OF CHRISTIAN HEALING.

A CONFERENCE on Christian healing will be held in Saint Paul's Cathedral Chapter House, Flinders Lane, Melbourne, on Tuesday, November 17, at 7.30 p.m. The Right Reverend Bishop D. Baker will preside. The following will address the conference: The Right Reverend the Bishop of Adelaide; The Right Reverend the Bishop of Gippsland; Dr. Robert Southby, Melbourne; Dr. Bruce Peterson, Sydney. Members of the British Medical Association are cordially invited to attend and to take part in the discussion.

Medical Prizes.

SAINT VINCENT PRIZE FOR MEDICAL SCIENCES.

THE following information has been received from the Director-General of Health, Canberra.

The Academy of Medicine of Turin, Italy, announces a competition for the first Saint Vincent Prize for Medical Sciences founded by the Regional Administration of the Valley of Aosta and by the SITAV of Saint Vincent for the purpose of promoting the development of scientific researches in the medical field. The conditions are as follows:

1. The prize will be granted for an essay, or group of essays, printed, dealing with a single subject in the medical field, and representing a noteworthy advance in the knowledge of the subject. The essays must have been published after 1950 and must reach the Academy of Medicine, Via Po, 18, Turin, not later than December 31, 1953.

2. The essays must have been published in one of the following languages: Italian, Latin, French, English, Spanish, Portuguese, German or Russian.

3. The essays must be forwarded to the Academy by registered letter, in five copies, two of which shall remain the property of the Academy.

4. Competitors are requested to enclose with their essays a summary in Italian or French.

5. The name of the winner will be announced at Saint Vincent, Valley of Aosta, in June, 1954, at a meeting sponsored by the Academy of Medicine.

AWARD FOR RESEARCH IN THE FIELD OF INFERTILITY.

THE American Society for the Study of Sterility announces the opening of the 1954 contest for the most outstanding contribution to the subject of infertility and sterility. The winner will receive a cash award of one thousand dollars, and the essay will appear on the programme of the 1954 meeting of the Society. Essays submitted in this competition must be received not later than March 1, 1954. Full particulars concerning requirements of this competition may be obtained from The American Society for the Study of Sterility, care of Dr. Herbert H. Thomas, Secretary, 920 South 19th Street, Birmingham, Alabama.

AN HONOUR FOR DR. K. W. STARR.

DR. K. W. STARR, of Sydney, has been appointed to the Board of Governors of the American College of Surgeons. This is an honour for Dr. Starr, and also for Sydney Hospital and Australian surgery.

Nominations and Elections.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Mayne, Stephen Leigh, M.B., B.S., 1952 (Univ. Sydney), 24 Springdale Road, Killara, New South Wales.

Deaths.

THE following death has been announced:

EVILLE.—Violet Polyxena Austin Eville, on October 26, 1953, at Perth, Western Australia.

Diary for the Month.

Nov. 14.—Victorian Branch, B.M.A.: Country Branch Meeting.
Nov. 16.—Victorian Branch, B.M.A.: Finance Subcommittee.
Nov. 17.—New South Wales Branch, B.M.A.: Medical Politics Committee.
Nov. 18.—Western Australian Branch, B.M.A.: General Meeting.
Nov. 19.—New South Wales Branch, B.M.A.: Clinical Meeting.
Nov. 19.—Victorian Branch, B.M.A.: Executive of Branch Council.
Nov. 24.—New South Wales Branch, B.M.A.: Ethics Committee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federal Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178 North Terrace, Adelaide): All Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rate is, £5 *per annum* within Australia and the British Commonwealth of Nations, and £6 10s. *per annum* within America and foreign countries, payable in advance.